WPS4598

POLICY RESEARCH WORKING PAPER 4598

# The Challenge of Reducing International Trade and Migration Barriers

*Kym Anderson*
*L. Alan Winters*

The World Bank
Development Research Group
Trade Team
April 2008

Policy Research Working Paper 4598


## Abstract

While barriers to trade in most goods and some services including capital flows have been reduced considerably over the past two decades, many remain. Such policies harm most the economies imposing them, but the worst of the merchandise barriers (in agriculture and textiles) are particularly harmful to the world's poorest people, as are barriers to worker migration across borders. This paper focuses on how costly those anti-poor trade policies are, and examines possible strategies to reduce remaining distortions. Two opportunities in particular are addressed: completing the Doha Development Agenda process at the World Trade Organization (WTO), and freeing up the international movement of workers. A review of the economic benefits and adjustment costs associated with these opportunities provides the foundation to undertake benefit/cost analysis required to rank this set of opportunities against those aimed at addressing the world's other key challenges as part of the Copenhagen Consensus project. The paper concludes with key caveats and suggests that taking up these opportunities could generate huge social benefit/cost ratios that are considerably higher than the direct economic ones quantified in this study, even without factoring in their contribution to alleviating several of the other challenges identified by that project, including malnutrition, disease, poor education and air pollution.


This paper—a product of the Trade Team, Development Research Group—is part of a larger effort in the department to analyse the consequences of trade reform for developing countries. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted via mchester@worldbank.org.

# The Challenge of Reducing International Trade and Migration Barriers

**Kym Anderson (Lead Author),**
**L. Alan Winters (co-author)**

kym.anderson@adelaide.edu.au
l.a.winters@sussex.ac.uk

Draft paper for the Copenhagen Consensus 2008 (CC08) Project. This draws on Anderson's earlier CC04 and CC06 papers which appear in the CUP books edited by B. Lomborg (*Global Crises, Global Solutions*, 2004 and *Solutions to the World's Biggest Problems: Costs and Benefits*, 2007). Helpful discussions with Will Martin, and computational assistance for Table 11 and the Figures from Ernesto Valenzuela and Johanna Croser, are gratefully acknowledged. The views expressed are the authors' alone.

**Contact:** Kym Anderson, School of Economics, University of Adelaide, Adelaide, SA 5005, Australia, phone +61 8 8303 4712, fax +61 8 8223 1460 kym.anderson@adelaide.edu.au

**Key words:** trade policy reform, Doha Development Agenda, international migration

**JEL codes:** F02, F13, F22, F15, F17

**Contact author:**

Kym Anderson
School of Economics
University of Adelaide
Adelaide, SA 5005, Australia
Phone +61 8 8303 4712
Fax +61 8 8223 1460
kym.anderson@adelaide.edu.au

**Second author:**

L Alan Winters
School of Social Sciences
University of Sussex
Brighton BN1 9QN
United Kingdom
L.A.Winters@sussex.ac.uk

# The Challenge of Reducing International Trade and Migration Barriers

The net economic and social benefits of reducing most government subsidies and opening economies to trade are enormous relative to the costs of adjustment to such policy reform. While barriers to trade in most goods and some services including capital flows have been reduced considerably over the past two decades, many remain. Such policies harm most the economies imposing them, but the worst of the merchandise barriers (in agriculture and textiles) are particularly harmful to the world's poorest people, as are barriers to worker migration across borders. Addressing this challenge would therefore also assist in meeting several of the other challenges identified in this project including malnutrition, disease, poor education and air pollution.

This paper focuses on how costly those anti-poor trade policies are, and examines possible strategies to reduce remaining distortions. Three opportunities in particular are addressed. The most beneficial prospect is the Doha Development Agenda of the World Trade Organization (WTO). If that proves to be too difficult politically to bring to a conclusion in the near future, the other two prospects we consider are sub-global preferential reforms such as the Free Trade Area of the Americas (FTAA) initiative, and the freeing up the international movement of workers.

The paper begins by defining the challenge. It then summarizes the arguments for removing trade and migration distortions, along with critiques by sceptics, before discussing the various opportunities for reducing subsidies and trade barriers and explaining why we choose to focus on the above-mentioned three. The core of the paper is in the next two sections, which review the economic benefits and adjustment costs associated with these three opportunities. That provides the foundation to undertake the benefit/cost analysis required to allow this set of opportunities to be ranked against those aimed at addressing the world's other key challenges. The paper concludes with key caveats that suggest that taking up these opportunities could generate social benefit/cost ratios that are considerably higher than the direct economic ones quantified in this study, not least because they would also go some way towards addressing several of the other challenges identified by the Copenhagen Consensus project.

## The challenge

Despite the net economic and social benefits of reducing most government subsidies[1] and barriers to international trade and migration, almost every national government intervenes in markets for goods, services, capital and labor in ways that distort

[1] Not all subsidies are welfare-reducing, and in some cases a subsidy-cum-tax will be optimal to overcome a gap between private and social costs that cannot be bridged à la Coase (1960). Throughout this paper all references to 'cutting subsidies' refer to bringing them back to their optimal level (which will be zero in all but those relatively few exceptional cases).

international commerce. To keep the task manageable, the policy instruments considered will be limited to those trade-related ones over which a government's international trade negotiators have some influence both at home and abroad, plus immigration numbers. That thereby excludes measures such as generic taxes on income, consumption and value added, government spending on mainstream public services, infrastructure and generic social safety nets in strong demand by the community, and subsidies (taxes) and related measures set optimally from the national viewpoint to overcome positive (negative) environmental or other externalities. Also excluded from consideration here are policies affecting markets for foreign exchange.

This challenge in its modern form has been with us for about 75 years. The latter part of the nineteenth century saw a strong movement toward laissez faire and widespread international migration, but that development was reversed following the first world war in ways that contributed to the Great Depression of the early 1930s and the conflict that followed (Kindleberger 1989). It was during the second world war, in 1944, that a conference at Bretton Woods proposed an International Trade Organization. An ITO charter was drawn up by 1947 along with a General Agreement on Tariffs and Trade (GATT), but the ITO idea died when the United States failed to progress it through Congress (Diebold 1952). Despite that, the GATT came into being from 1948 and during its 47-year history (before it was absorbed into the WTO on 1 January 1995) oversaw the gradual lowering of many tariffs on imports of most manufactured goods by governments of high-income countries. Manufacturing tariffs remained high in developing countries, however, and distortionary subsidies and trade policies affecting agricultural, textile, and services markets of both rich and poor countries, plus immigrations restrictions, continued to hamper efficient resource allocation, consumption choices, economic growth and poverty alleviation.

The GATT's Uruguay Round of multilateral trade negotiations led to agreements signed in 1994 that contributed to trade liberalization over the subsequent 10 years. But even when those agreements were fully implemented by early 2005, and despite additional unilateral trade liberalizations since the 1980s by a number of countries (particularly developing and transition economies), many subsidies and trade and migration restrictions remained. They include not just trade taxes-cum-subsidies but also contingent protection measures such as anti-dumping, regulatory standards that can be technical barriers to trade, and domestic producer subsidies (allegedly decoupled from production in the case of some farm support programs in high-income countries, but in fact only partially so). Insufficient or excessive taxation or quantitative regulations in the presence of externalities such as environmental or food safety risks also lead to inefficiencies and can be trade distorting. Furthermore, the on-going proliferation of preferential trading and bilateral or regional integration arrangements – for which there would be far less need in the absence of high barriers to trade and migration– is adding complexity to international economic relations. In some cases those arrangements are leading to trade and investment diversion rather than creation, changes that may be welfare reducing for some economies.

The reluctance to reduce trade distortions is almost never because such policy reform involves government treasury outlays. On the contrary, except in the case of a handful of low-income countries still heavily dependent on trade taxes for government revenue, such reform may well benefit the treasury (by raising income or consumption/value added tax revenues more than trade tax revenues fall, not to mention any payments foregone because of cuts to subsidy programs). Rather, trade distortions and barriers to immigration remain largely because further liberalization and subsidy cuts would redistribute jobs, income and wealth in ways that those in

government fear would reduce their chances of remaining in power (and possibly their own wealth in countries where corruption is rife). The challenge involves finding politically attractive ways to phase out remaining distortions to world markets for goods and services, including for the capital and labour used to produce those products.

This challenge is even greater now than it was in the inaugural Copenhagen Consensus project four years ago. One reason is that the WTO membership is struggling to address the Doha Development Agenda that was launched in the immediate aftermath of 11 September 2001 – a time when there was much more goodwill to cooperate multilaterally than seems to be the case now. Another reason is greater doubts about the wisdom in predominantly Christian western countries of allowing more immigrants from Moslem countries where recent global terrorism seems to have emerged. More generally, this is but part of a broader disenchantment with globalization that could result not just in a failure to reach agreement under the Doha round to multilaterally liberalize trade, but also in the *raising* of current trade and immigration barriers. Such a reversal of past reforms could do huge damage to the global trading system and raise global inequality. That suggests the counterfactual to opening markets is not the status quo but something potentially much worse than the present.

Evidence of anti-globalization sentiment abounds despite the lowered frequency and ferocity of public protests of the sort first seen at the WTO's Trade Ministerial in Seattle in 1999 and annual meetings on the World Bank and IMF early this decade.[2] One recent example is a Financial Times/Harris poll in the United States and the five largest European countries, where those polled were nearly three times more likely to say globalization was having a negative rather than a positive effect on their countries (Giles 2007). Such attitudes contributed to the decision at the June 2007 Summit of EU leaders to bend to France's demand to drop the principle of free and undistorted competition from the treaty that, if ratified, will replace the EU constitution that was voted down by French and Dutch voters in 2005. Another example is the threat by members of the US congress to impose arbitrary trade barriers on products flooding in from China and to oppose liberal trade initiatives by the Bush Administration (e.g., for several bilateral free-trade agreements and for comprehensive immigration reform).

These and similar examples underscore the need to re-emphasize the virtues of a more open global trading system – a system to which around 70 additional developing and transition economies have subscribed since the WTO came into being in 1995, with a further 28 (including Russia) currently striving to join. The case needs to be made within the context of the on-going information and communication technology (ICT) revolution that is globalizing the world's economies ever-more rapidly[3] and, via the internet, exposing differences in living standards to ever-more

[2] That clash between the key international financial institutions and civil society groups is ironic since both seek the same outcome, namely a reduction in global poverty. As pointed out by Kanbur (2001), this common goal suggest there is much scope for the two groups to discuss their differences in views as to the best means to that end. And indeed they have been in much closer dialogue in recent years, a result of which has been some convergence of views on the policy reforms needed to promote pro-poor economic development.

[3] So rapid is this phenomenon that one author has felt the need to revise his popular book on the subject three times in three years (Friedman 2007). Its influence on fragmenting the process of production has been sufficiently profound for economists to begin developing a theory of trade in 'tasks', to capture the fact that firms are offshoring an increasing array of their activities (e.g., Grossman and Rossi-Hansberg 2006).

people in developing countries and thereby raising demands for an easing of restrictions on international migration.

## Arguments for Reducing Trade Distortions and Migration Barriers

Even before examining the empirical estimates of the benefits and costs of grasping various trade- and migration-liberalizing opportunities, the case can be made that such reform in principle is beneficial economically.[4] It then remains to examine whether particular reforms are also positive or negative in terms of net social and environmental outcomes. The latter cannot be dealt with here in the same depth as the narrower economic analysis, but it is important because there are many who believe or assume the net social and environmental consequences are sufficiently negative as to outweigh the net economic benefits of market opening. We begin with the static and then dynamic gains from trade arguments and then turn briefly to the economic effects of international migration of workers.

### *Static economic gains from own-country trade and subsidy reform*

The standard comparative static analysis of national gains from international trade emphasizes the economic benefits from production specialization and exchange so as to exploit comparative advantage in situations where a nation's costs of production and/or preferences differ from those in the rest of the world. This is part of the more general theory of the welfare effects of distortions in a trading economy, as summarized by Bhagwati (1971). Domestic industries become more productive on average as those with a comparative advantage expand by drawing resources from those previously protected or subsidized industries that grow slower or contract following reform. The gains from opening an economy are larger, the greater the variance of rates of protection among industries – especially within a sector, insofar as resources are more mobile within than between sectors (Lloyd 1974). Likewise, the more productive domestic firms *within* industries expand by drawing resources from less productive firms that contract or go out of business. Indeed theory and empirical studies suggest the shifting of resources within an industry may be more welfare-improving than shifts between industries.[5]

The static gains from trade tend to be greater as a share of national output the smaller the economy, particularly where economies of scale in production have not been fully exploited and where consumers (including firms importing intermediate inputs) value variety so that intra- as well as inter-industry trade can flourish. Less-than-full exploitation of scale economies is often the result of imperfect competition being allowed to prevail in the domestic marketplace, which again is more common in smaller and poorer economies where industries have commensurately smaller numbers of firms. This is especially the case in the service sector. One example is sub-sectors such as utilities, where governments have been inclined to sanction

[4] This survey does not pretend to provide a comprehensive coverage of the gains-from-trade theory, and is even more limited in covering the economics of international migration. For more trade theory, readers are referred to the handbooks by Grossman and Rogoff (1995) and Harrigan and Choi (2003) and the new textbook by Feenstra (2004). For a survey of the economics of migration, see for example Borjas (1994) and Faini, de Melo and Zimmermann (1999).

[5] See Melitz (2003) on the theory of this point and Trefler (2004) for an early empirical illustration.

monopoly provision.[6] The gain comes from firms having to reduce their mark-ups in the face of greater competition.

Those gains from opening up will be even greater if accompanied by a freeing up of domestic markets and the market for currency exchange. The more stable is domestic macroeconomic policy, the more attractive will an economy be to capital inflows. And the more domestic microeconomic policies are friendly to markets and competition for goods, services and productive factors, the greater the likelihood that adjustments by firms and consumers to trade liberalization will lead to a more-efficient utilization of national resources and greater economic welfare (Corden 1997). If domestic policy reforms included improving the government's capacity to redistribute income and wealth more efficiently and in ways that better matched society's wishes, concerns about the distributional consequences of trade liberalization also would be lessened.

With the vastly increased scope during the past decade to separate in time and space the various productive tasks along each value chain, thanks to the ICT revolution, firms are increasingly able to take advantage of factor cost differences across countries for specific tasks without having to sacrifice gains from product specialization or move the whole of their production operation offshore (Hanson, Mataloni and Slaughter 2005). Trade in many tasks (e.g., emailing data files) is not even recorded in official trade statistics and so is not directly subject to trade policies. That suggests the variance of import protection across all traded items is even greater than across just recorded trade in goods, so the welfare gains from reducing the latter could well be greater than that captured by conventional trade models.

***Dynamic economic gains from own-country trade and subsidy reform***

To the standard comparative static analysis needs to be added links between trade and economic growth. The mechanisms by which openness contributes to growth are gradually getting to be better understood by economists, thanks to the pioneering work of such theorists as Grossman and Helpman (1991), Rivera-Batiz and Romer (1991) and the literature those studies spawned, including econometric papers based on firm-level databases. Channels through which openness to trade can affect an economy's growth rate include the scale of the market when knowledge is embodied in the products traded, the degree of redundant knowledge creation that is avoided through openness, and the effect of knowledge spillovers (Romer 1994, Taylor 1999, Acharya and Keller 2007).

The dynamic gains from openness can be greater when accompanied by reductions in domestic distortions. As one example, Helpman and Itskhoki (2007) develop a two-country two-sector model of international trade in which one sector produces homogeneous products while the other, which produces differentiated products, has firm heterogeneity, monopolistic competition, search and matching in its labor market, and wage bargaining (so that some of the workers searching for jobs end up being unemployed). The two countries are similar except for frictions in their labor markets. They show that both countries gain from trade but that the country with lower labor market frictions gains proportionately more, and that its flexible labor market confers comparative advantage: the flexible country is a net exporter of differentiated products. Either country benefits by lowering frictions in its labor

[6] The argument for allowing such monopolies is that they could provide greater technical efficiency via their larger scale. The contrary argument is that, being sheltered from competition, they fall so short of that potential as to be less productive than two or more smaller-scale competing suppliers.

market, but that harms the other country; but a simultaneous proportional lowering of labor market frictions in both countries benefits both of them. With trade integration both countries benefit (even though it may raise their rates of unemployment), but the flexible country has higher total factor productivity in this model.

When that trade reform includes financial markets, more is gained than just a lower cost of credit. The resulting financial deepening can stimulate growth too (Townsend and Ueda 2007). Prasad et al. (2006) add two other indirect growth-enhancing benefits of financial reform: they discipline firms to look after the interests of shareholders better and they discipline governments to provide greater macroeconomic stability.

Importantly from a policy maker's viewpoint, the available empirical evidence strongly supports the view that open economies grow faster (see the surveys by USITC 1997, Winters 2004, Billmeier and Nannicini 2007 and Francois and Martin 2007). Notable early macroeconometric studies of the linkage between trade reform and the rate of economic growth include those by Sachs and Warner (1995) and Frankel and Romer (1999). More-recent studies also provide some indirect supportive econometric evidence. For example, freeing up the importation of intermediate and capital goods promotes investments that increase growth (Wacziarg 2001). Indeed, the higher the ratio of imported to domestically produced capital goods for a developing country, the faster it grows (Lee 1995; Mazumdar 2001). Greater openness to international financial markets also boosts growth via the stimulation to investment that more risk-sharing generates.

Rodrigeuz and Rodrik (2001) examine a number of such studies and claim the results they surveyed are not robust. However, in a more recent study that revisits the Sachs and Warner data and then provides new time-series evidence, Wacziarg and Welch (2003) show that dates of trade liberalization do characterize breaks in investment and GDP growth rates. Specifically, for the 1950-1998 period, countries that have liberalized their trade (raising their trade-to-GDP ratio by an average of 5 percentage points) have enjoyed on average 1.5 percentage points higher GDP growth compared with their pre-reform rate.

There have also been myriad case studies of liberalization episodes. In a survey of 36 of them, Greenaway (1993) reminds us that many things in addition to trade policies were changing during the studied cases, so ascribing causality is not easy. That, together with some econometric studies that fail to find that positive link, led Freeman (2004) to suggest the promise of raising the rate of economic growth through trade reform has been overstated. But the same could be (and has been) said about the contributions to growth of such things as investments in education, health, agricultural research, and so on (Easterly 2001). A more-general and more-robust conclusion that Easterly draws from empirical evidence, though, is that people respond to incentives. Hence getting incentives right in factor and product markets is crucial – and removing unwarranted subsidies and trade barriers is an important part of that process. Additional evidence from 13 new case studies reported in Wacziarg and Welch (2003) adds further empirical support to that view, as does the fact that there are no examples of autarkic economies that have enjoyed sustained economic growth, in contrast to the many examples since the 1960s of reformed economies that boomed after opening up.

Specifically, economies that commit to less market intervention tend to attract more investment funds, ceteris paribus, which raise their stocks of capital (through greater aggregate global savings or at the expense of other economies' capital stocks). This is consistent with the findings by Faini (2004) that trade liberalization in the

1990s fostered inward foreign investment (and both had a positive impact on investment in education) while backtracking on trade reform had a negative impact on foreign investment. More-open economies also tend to be more innovative, because of greater trade in intellectual capital (a greater quantity and variety of information, ideas and technologies, sometimes but not only in the form of purchasable intellectual property associated with product and process innovations), and because greater competition spurs innovation (Aghion and Griffith 2005; Aghion and Howitt 2006) ), leading to higher *rates* of capital accumulation and productivity growth (Lumenga-Neso, Olarreaga and Schiff 2005).[7]

A growing body of industry studies, including ones based on firm-level survey data that capture the reality of firm heterogeneity, provides additional support for the theory that trade reform boosts the rate of productivity growth.[8] It appears more-productive firms are innately better at exporting, so opening an economy leads to their growth and the demise of the least-productive firms (Bernard et al. 2007). That leads to better exploitation of comparative advantage in terms not only of industries but also of firms within each industry. If those more-productive firms are also foreign owned, as is clearly the case in China (Whalley 2006), then being open to FDI multiplies the gains from product trade openness. And if those foreign firms are involved in retailing, and they enter a country with suppliers whose productivity is below best-practise, they can put pressure on those suppliers to raise their productivity (and perhaps alert them as to ways to do that). Walmart's influence in Mexico provides one example of this force at work (Javorcik, Keller and Tybout 2006). Furthermore, if the foreign firms are supplying lower-cost services inputs into manufacturing, that can boost the productivity growth of local manufacturers using those service inputs, according to a recent study of the Czech Republic (Arnold, Javorcik and Mattoo 2006).[9]

It need not be just the most-productive firms that engage in exporting. For lower-productivity firms, incurring the fixed costs of investing in newly opened foreign markets may be justifiable if accompanied by the larger sales volumes that come with exporting. Lower foreign tariffs will induce these firms to simultaneously export and invest in productivity (while inducing higher-productivity firms to export without more investing, as in Melitz 2003). Lileeva and Trefler (2007) model this econometrically using a heterogeneous response model. Unique 'plant-specific' tariff cuts serve as their instrument for the decision of Canadian plants to start exporting to the United States. They find that those lower-productivity Canadian plants that were induced by the tariff cuts to start exporting increased their labor productivity, engaged in more product innovation, and had high adoption rates of advanced manufacturing technologies. These new exporters also increased their domestic (Canadian) market share at the expense of non-exporters, which suggests that the labor productivity gains reflect underlying gains in total factor productivity.

In short, trade liberalization can lead not just to a larger capital stock and a one-off increase in productivity but also to higher *rates* of capital accumulation and productivity growth in the reforming economy because of the way reform energizes entrepreneurs. For those higher growth rates to be sustained, though, there is widespread agreement that governments also need to (a) have in place effective institutions to efficiently allocate and protect property rights, (b) allow domestic

[7] More open economies also tend to be less vulnerable to foreign shocks such as sudden stops in capital inflows, currency crashes and severe recessions (Frankel and Cavallo 2004).

[8] For an overview of this new theory, see Helpman, Marin and Verdier (2008).

[9] For a survey of the growth effects of opening to trade in services, see Hoekman (2006).

factor and product markets to function freely, and (c) maintain macroeconomic and political stability (Rodrik 2003; Wacziarg and Welch 2003; Baldwin 2004; Chang, Kaltani and Loayza 2005).

Perhaps the best single paper that brings these ideas together using a numerical open economy growth model is that by Rutherford and Tarr (2002). Their model allows for product variety, imperfect competition, economies of scale and international capital flows. It is dynamic, so the model can trace out an adjustment path to trade reform; and it is stochastic in that it draws randomly from uniform probability distributions for eight key parameters of the model. They simulate a halving of the only policy intervention (a 20 percent tariff on imports) and, in doing so, fully replace the government's lost tariff revenue with a lump-sum tax. That modest trade reform produces a welfare increase (in terms of Hicksian equivalent variation) of 10.6 percent of the present value of consumption in their central model. Systematic sensitivity analysis with 34,000 simulations showed that there is virtually no chance of a welfare gain of less than 3 percent, and a 7 percent chance of a welfare gain larger than 18 percent of consumption. Several modeling variants and sensitivity analysis on all the key parameters found that the welfare estimates for the same 10 percentage point tariff cut ranged up to 37 percent when international capital flows are allowed, and down to 4.7 percent when using the most inefficient replacement tax (a tax of capital). The latter result shows that even the very inefficient tax on capital is superior to the tariff as a revenue raiser. Increasing the size of the tariff cuts results in roughly proportional increases in the estimated welfare gains. Large welfare gains in the model arise because the economy benefits from increased varieties of foreign goods, which dominate the decrease in varieties of domestic goods. In order to assess the importance of variety gains, they then assume that one of the two sectors is subject to constant returns to scale and perfect competition (CRS/PC) – and find in that case that the additional varieties do not increase total factor productivity. Instead, a small welfare gain of about 0.5 percent of the present value of consumption emerges, which is of the same order of magnitude as in the many comparative static CRS/PC computable general equilibrium studies. Their results also illustrate the importance of complementary reforms to fully realize the potential gains from trade reform. In particular, with the ability to access international capital markets the gains are roughly tripled; and use of inefficient replacement taxes significantly reduce the gains. These combined results underscore the point that complementary macroeconomic, regulatory, and financial market reforms to allow capital flows and efficient alternate tax collection are crucial to realizing the potentially large gains from trade liberalization.

### *Economic consequences of international migration*

Half a century ago it was shown, using the simplest of trade models, that trade in products could be a perfect substitute for trade in capital and labour (Mundell 1957). But increasingly it has become apparent that trade in factors of production can complement trade in goods, in which case freeing both would yield greater gains (Markusen 1983). Indeed theory cannot predict whether that would result in factor trade increasing more or less than product trade (Michaely 2003), which suggests the greatest gains would come to those countries that open both. Certainly the two forces happened simultaneously in the latter nineteenth century in what might be considered the first modern wave of globalization. And if product trade liberalization runs into

political difficulties, there is all the more reason to expect gains from liberalizing international migration of workers, thereby bringing about greater wage equality across countries. By strengthening social and business networks across borders, migrants can lower the cost of and improve the quality of information on opportunities for trade and investment.

The economic consequences even at the country level are somewhat more complicated for worker flows than for product flows between nations, because the one-to-one correspondence between people and countries is disturbed. Perhaps the simplest way to deal with that is to consider the welfare of the new migrants separately from that of the host country's other residents and the remaining source country residents. But if new migrants repatriate a significant share of their earning from the host country to the source country, that will boost economic welfare of those remaining in the developing country. And if new migrant workers are more able to compete with earlier migrants than with locally born workers in the host country, those communities need to be separately identified too.

## Opportunities for Reducing Barriers to Trade and Migration

Among the more-feasible opportunities available today for encouraging trade negotiations to stimulate significant market opening and subsidy cuts, the most obvious is a non-preferential legally binding partial reform following the WTO's current round of multilateral trade negotiations, the Doha Development Agenda (DDA)**.**

A second type of trade negotiating opportunity involving a subset of the world's economies is a reciprocal preferential agreement. Efforts are also being made to negotiate a Free Trade Area of the Americas (FTAA), which potentially would bring together all the economies of North, Central and South America. This is perhaps the largest reciprocal preferential agreement currently in prospect, and dwarfs the bilateral FTA negotiations and discussions the US and EU are each having with a range of other countries.[10] It is examined both without and with the prospect of an EU-Mercosur FTA.

There is also the opportunity for other high-income countries to follow the EU offer to Least-Developed Countries (LDCs) and African, Caribbean and Pacific (ACP) small countries of duty-free access to their markets, but this opportunity involves only a very small volume of global trade (and may well cause losses for other poor countries that are not LDCs or ACPs, so could even worsen inequality among low-income countries), so estimates of its benefits are mentioned just in passing.

A more radical opportunity is considered instead, namely the freeing up of international flows of workers. Even though the WTO's current DDA could include it as part of the services (GATS Mode IV) negotiations (see Mattoo and Carzaniga 2002), it appears to have little prospect of being adopted multilaterally in this current round of negotiations. However, individual countries could adopt it unilaterally with the stroke of the legislators' pen. Hence it is considered separately from the first opportunity described above.

[10] A potentially larger FTA is that among members of APEC (the Asia Pacific Economic Cooperation forum). Currently referred to as FTAAP, it is embryonic and ill-formed at this stage.

## Economic Effects of Current Trade Barriers and Farm Subsidies

All the estimates considered below of the potential economic welfare gains from these opportunities are generated using computable general equilibrium (CGE) models of the global economy, the most common of which (GTAP) is described in the Appendix. The CGE welfare gains refer to the equivalent variation in income (EV) as a result of each of the shocks described.[11] While not without their shortcomings (see Francois 2000, Whalley 2000, Anderson 2003 and the caveats below), CGE models are far superior for current purposes to partial equilibrium models, which fail to capture the economy-wide nature of the adjustments to reform whereby some sectors expand when others contract and release capital and labor. They are also superior to macroeconometric models which typically lack sufficient sectoral detail and are based on time series analysis of the past which may no longer be relevant for the near future (Francois and Reinert 1997). CGE models were first used in multilateral trade reform analysis in ex post assessments of the Tokyo Round of GATT negotiations in the late 1970s/early 1980s (Cline et al. 1978; Deardorff and Stern 1979, 1986; Whalley 1985). Since then they have been used increasingly during and following the Uruguay Round, as well as for ex ante assessments of the Doha Round, of bilateral and other preferential economic integration agreements, and of unilateral reforms such as when a country considers acceding to the WTO.

Empirical comparative static economy-wide CGE model simulations of the potential economic welfare gains from prospective multilateral trade liberalization typically generate positive gains for the world and for most participating countries. In the case of sub-global preferential trade reform studies, the estimated gains to the countries involved are always smaller, and some excluded countries – and even some participating ones – may lose. When increasing returns to scale and monopolistic competition (IRS/MC) are assumed instead of constant returns to scale and perfect competition (CRS/PC), and firms are assumed to be heterogeneous rather than homogeneous, and when trade is liberalized not just in goods but also in services and investment flows, the estimates of potential gains can increase several fold. Economy-wide modelers have also begun to examine the effects of lowering barriers to temporary labor movements across national borders. Virtually all such studies are in comparative static mode however, and so are unable to capture the crucially important growth-enhancing dynamic effects of trade reform described in the previous section. It is therefore not surprising that they generate results for gains from trade reform that are only a small fraction of GDP.

Such low estimated gains seem to fly in the face of casual empiricism. Irwin (2002), for example, notes that three different countries in three different regions chose to liberalize in three different decades (Korea from 1965, Chile from 1974 and India from 1991 – see Irwin 2002, Figures 2.3 to 2.5), and per capita GDP growth in each of those countries accelerated markedly thereafter by several percentage points per year. Admittedly those historical liberalization experiences involved also complementary reforms to other domestic policies and institutions that would have contributed significantly to the observed boosts in economic growth. Even so, they

[11] EV is defined as the income that consumers would be willing to forego and still have the same level of well-being after as before the reform. For a discussion of the merits of EV versus other measures of change in economic welfare, see for example Just, Hueth and Schmitz (2004).

support the point made in the previous section that trade can generate not only static efficiency gains but also dynamic gains.

Some CGE modellers have tried to proxy that dynamic effect by adding an additional one-off total factor productivity shock to their trade reform scenarios. But reform may also raise the *rate* of factor productivity growth and/or of capital accumulation. Such endogenous growth has yet to be satisfactorily introduced into CGE models, and in any case it is unclear how to interpret a model's estimated welfare effects if households are reducing current consumption in order to boost their or their descendents' future consumption by investing more.

It should be kept in mind that all the experiments in the comparative static CGE studies surveyed below reduce only trade barriers plus agricultural production and export subsidies. The reasons for including subsidies only in agriculture are that they are the key subsidies explicitly being negotiated at the WTO (where non-agricultural export subsidies are illegal), they represented an estimated two-fifths of all government expenditure on subsidies globally during 1994-98 (van Beers and de Moor 2001, Table 3.1), and they are fully represented in the GTAP database whereas subsidies for most other sectors are not included so it is not possible to estimate their welfare cost within the same framework. And the reason for not also explicitly estimating the welfare impacts of other domestic policies and institutions (even though, because of their complementarity, they can affect the payoff from opening up) is that typically they are beyond the sphere of influence of international trade negotiators.

With this as background, we first consider estimates of the economic benefits associated with freeing global trade completely, before turning to each of the three opportunities for politically more feasible partial reforms. The reasons for reviewing gains from full trade reform are two-fold: because it provides a benchmark against which to compare the benefits of lesser reforms; and because several models have generated full global trade reform results,[12] making it possible to see the range of outcomes that emerge from these different models.

### *Global cost of current distortions to international trade*

Estimates of the global cost of current trade distortions are obtained by simulating the removal of those policies as represented in a global CGE model. Table 1 reports a selection of estimates of the economic benefits associated with complete removal of goods trade barriers and agricultural production and export subsidies.

The first one listed in Table 1 is by Anderson, Martin and van der Mensbrugghe (2006a,b). The AMV study provides the simplest scenario: full global liberalization of just merchandise trade and farm subsidies. It uses the latest version of the World Bank's Linkage model, assuming constant returns to scale and perfect competition in all product and factor markets.[13] The GTAP Version 6 database, which provides trade and protection data for 2001 (see Dimaranan 2006), is employed in that study to generate a new baseline for 2005 (allowing for recent policy changes including the completion of implementation of the Uruguay Round, the EU expansion to 25 members, and the accession of new members such as China and Taiwan to

[12] Full opening of borders to immigration would be such a huge shock, and so unlikely politically relative to opening product and capital markets, as to not worth considering.

[13] The Linkage Model is fully described by its creator (van der Mensbrugghe 2005). It is more of a long-run model than GTAP, having higher supply and trade elasticities, and it is recursive dynamic and so is readily projected forward.

WTO), and then to project the world economy forward a decade assuming no further trade policy reforms. This baseline for 2015 is then compared with how it would look after full adjustment following the phased removal of all countries' trade barriers and agricultural subsidies from 2005. The economic welfare gain is estimated to be US$287 billion per year in 2001 dollars as of 2015 (and hence slightly more each year thereafter as the global economy expands). Of that, $86 billion p.a. is estimated to accrue to developing countries.

These AMV results are the lowest of the estimates summarized in Table 1, and so should be considered as very much lower-bound estimates of the current cost of global distortions to international trade. But they have been widely used in the WTO's Doha Round as a measure of what is on the table for negotiation in the DDA's agricultural and NAMA (non-agricultural market access) talks, in part because they have also been carefully decomposed in various ways to illuminate the relative importance of the various issues under discussion (see below).

The second study listed in Table 1, BKS, is by Brown, Kiyota and Stern (2005). It uses the Version 5 GTAP data base projected from its 1997 base to 2005, but they embed it in the authors' static Michigan Model of World Production and Trade (www.ssp.umich.edu/rsie/model) to produce the highest of the surveyed estimates of global welfare gains from complete removal of trade barriers and agricultural subsidies: $2,616 billion p.a. when converted in 2001 US dollars. This much larger estimate is the result of several features of the BKS study: having China and Taiwan's implementation of their WTO accession commitments in the experiment rather than in the baseline; the inclusion of increasing returns to scale and monopolistic competition (IRS/MC) for non-agricultural sectors and therefore product heterogeneity at the level of the firm rather than the national industry; liberalization of services in addition to goods trade (with IRS/MC assumed for the huge services sector); and the inclusion in services liberalization of the opening to foreign direct investment. The latter boosts substantially the gains from services liberalization, which account for nearly two-thirds of this study's estimated total gains.

The other two estimates in Table 1 of the gains from complete trade liberalization are between these two extremes. The HRT study (Harrison, Rutherford and Tarr 2002) uses much larger trade elasticities than other models and so gets a considerable gain for goods trade reform ($514 billion compared with AMV's $287 billion) even though it refers to 1995 when the world economy was somewhat smaller.

The WBGEP study (World Bank 2002) uses the World Bank's Linkage model but the Version 5 GTAP protection levels as of 1997, before projecting the world economy to 2015. That WBGEP study differs from the AMV study not only in using an older protection database (as do the BKS and HRT studies) but also in assuming liberalization boosts factor productivity in each industry according to the extent of growth in the share of production exported by the industry. The case presented suggests the gains would be $901 billion p.a. when converted in 2001 US dollars. By way of comparison, AMV re-ran their more recent model with that same factor productivity multiplier, and it boosted their total global gains from $287 billion to $461 billion (Anderson, Martin and van der Mensbrugghe 2006a, Table 12.20). The fact that this is barely half as large as the number in the WBGEP study has been the subject of much discussion, and led to a detailed explanation being provided by van der Mensbrugghe (2006). The explanation involves a mixture of factors, including a new source of data on tariffs (which incorporated tariff preferences more comprehensively and hence lowered the average bilateral tariff) and on agricultural

assistance (which on average implied less agricultural protectionism, and the incorporation of major reforms between 1997 and 2005 (most notably implementation of the Uruguay Round agreements, including the phase-out of the Multifibre Arrangement, EU expansion, and the reforms in China that accompanied its accession to WTO). On the one hand, the fact that this drop in the cost of remaining trade distortions was so large is worth celebrating, as it indicates the extent to which distortions in the world's markets for goods have been reduced in less than one decade. On the other hand, the cost of policies still in place remains huge, hence this paper's search for opportunities to bring about further liberalization.

***Which countries bear the cost, and which sectoral policies impose the cost?***

The AMV study has laid out how its estimated global cost of current policies affecting merchandise trade is distributed across countries and from which sectoral policies they originate. The basis of that is the estimated tariff structure of 2005, summarized in Table 2. It shows agricultural products are subject to much higher tariffs than manufactures, especially in high-income countries which also provide large subsidies to farmers. It also shows that tariffs in developing countries are much higher than in high-income countries for manufactures, and almost as high for farm products. From that one would expect developing countries to be imposing a high cost on themselves from their own policies, and agricultural policies to be a significant contributor to the global cost of merchandise trade distortions.

The detailed country distribution of AMV's estimated welfare costs is provided in Table 3, where it is expressed as a gain from full liberalization. The real value in 2001 US dollars is shown in column 1, and it is subdivided in columns 2 and 3 into that part due to the terms of trade effects of current policies (which for small countries in a homogeneous-products model would be equivalent to the effect of other countries' policies, but not in models using Armington trade elasticities that distinguish products by country of origin and so give each country some degree of market power internationally), and to the rest (which is predominantly due to own-country policies). The bold rows towards the bottom of the table indicate for high-income countries that one-seventh of the cost to them comes from the adverse terms of trade effects of global distortions, whereas for developing countries the opposite is true: global reform would worsen their terms of trade. Hence the difference between the two country groups in absolute cost of own-country policies is closer than the overall cost, although still higher for high-income countries. When expressed as a percentage of baseline income, however, the loss is greater for the developing country group, at 0.8 percent compared with 0.6 percent for high-income countries; and in so far as column 2 proxies the cost contribution of other countries' policies, then the final numbers in parentheses suggest developing countries' losses from policies of that country group are proportionately more than twice those of the much larger high-income economies (1.1 compared with 0.5 percent) – which is consistent with the differences in average tariffs reported in Table 2.

Table 4 summarizes how those costs are attributable to different sectors of the two country groups. Row 9 suggests that agricultural and food policies are responsible for 63 percent of the cost of merchandise trade distortions to both developing and high-income countries. That is, even though that sector represents only about one-twelfth of global production and trade, its policies contribute nearly two-thirds of the welfare loss from trade and subsidies affecting goods markets. Also, columns 4 and 5 show that for developing countries the cost is split equally between policies of high-

income countries and those of developing countries, whereas for rich countries 58 percent of the cost is from own-country and other rich countries' policies.

Despite the large cost of agricultural policies to developing countries as a group, an important question was raised during and following the Copenhagen Consensus process in 2004 (Panagariya 2004). It was: wouldn't that cost be borne predominantly by relatively affluent agricultural exporters such as Argentina, Brazil and Thailand, while poorer developing countries such as in Sub-Saharan Africa (SSA) would be beneficiaries of current agricultural protection policies of high-income countries? SSA countries would be benefiting, so Panagariya's argument went, either as net food importers (since international food prices are depressed by rich-country agricultural protection) or as net agricultural exporters accessing (duty-free and often quota-free) those protected markets via preferential trade agreements such as enjoyed by former colonies or least-developed countries. The first part of the argument seems to be supported by column 2 of Table 3, which shows that Argentina, Brazil and Thailand – along with Australia and New Zealand – are the main losers from the terms of trade effects of current policies. But so too is the southern Africa region, while the rest of SSA benefits (i.e., would lose from full merchandise liberalization).

To address Panagariya's question more fully requires restricting the experiment to just agricultural policies and of just high-income countries, and to decomposing the effects to see the contributions of agricultural versus non-agricultural prices of imports versus exports. That has been since done in a paper by the same AMV authors and reported in Tables 5 and 6. Table 5 reveals that indeed SSA's agricultural and food import price index rises, but so too does the export price index. Evidently the rise in demand for SSA exports enjoying little or no preferential access more than outweighs the reduced earnings from their exports that have been enjoying substantial preferences. But that is only half the story. The other half has to do with changes in prices of non-agricultural products. Table 5 shows that while the price of other imported goods rises slightly, because of growth in demand for relative to supply of them in high-income countries as their incomes rise, the price of SSA's exports of non-agricultural goods rises even more. The relative importance of each of these sets of price changes in contributing to the changes in regional economic welfare is summarized in Table 6, which reveals two things. First, the negative contribution to SSA welfare from higher import prices is more than offset by the positive contribution from higher export prices (except for farm products in South Africa where they almost cancel out). And second, the contributions on both the export and import side are larger from non-agricultural than from agricultural price changes. So even though the price changes shown in Table 5 for SSA from high-income country agricultural liberalization are smaller for non-farm than farm products, the greater weight of non-farm products means their net positive welfare contribution to SSA via the terms of trade effect is greater.[14]

***Within agriculture, which policy instruments reduce welfare most?***

As the WTO's Doha negotiations on agriculture got under way from late 2001, developing countries initially put most emphasis on the need to reduce agricultural subsidies. So when an early draft of the Anderson and Martin (2006) book presented results suggesting those subsidies contributed little to the global welfare cost of

[14] This is very similar to the result found by the OECD Secretariat using their version of the GTAP model known as GTAPEM, which is almost the same as the GTAP model referred to in the Appendix (Tangermann 2005).

agricultural policies relative to restrictions on market access (just 7 percent, compared with the 93 percent contribution of import tariffs), those CGE modeling results were treated with some scepticism.[15] To convince sceptics required examining the issue from first principles, to show that the 93 percent result – which is supported by the modeling studies of two other institutions (USDA 2001 and OECD 2006) – is not just an artifact of the computable general equilibrium models they use.[16] A study by Anderson, Martin and Valenzuela (2006) was designed to provide more intuition for this repeated research finding. To ensure transparency, it used widely available data and focused on a simple back-of-the-envelope model rather than a computable general equilibrium (CGE) model with its inherent complexities. Its results confirmed the overwhelming importance of market access found in the studies using CGE models.

Despite these results, domestic support should not be ignored in the Doha negotiations, not least because it is extremely important for some products of great interest to developing countries. This is particularly so for cotton, where Anderson and Valenzuela (2007) estimate that abolishing domestic subsidies on cotton would provide almost 80 percent of the $147 million in total welfare gains to Sub-Saharan Africa from cotton market reform. There is also a systemic risk that restraints on market access barriers, if unaccompanied by restraints on domestic support, could lead some high-income countries to replace market access barriers with distorting domestic support. The key policy message to draw from these results, though, is that reductions in domestic support cannot, alone, be expected to realize very much of the potential global trade and welfare gains sought from the Doha agricultural negotiations, and that achieving improvements in market access is extremely important for a successful outcome in these negotiations.

## Quantifying Economic Benefits of Reducing Barriers to International Trade and Migration

In the light of the above modeling results showing the costs of current policies, we focus now on assessing in turn the benefits from the three opportunities identified earlier in the paper to reduce those distortions, namely via the Doha Development Agenda of the World Trade Organization (WTO), via sub-global preferential trade reforms such as the Free Trade Area of the Americas (FTAA) initiative, and via allowing more international movement of workers.

### *Prospective benefits from the Doha Development Agenda*

Anderson, Martin and van der Mensbrugghe (2006a,b) examine in great detail the comparative static consequences of the main options that have been canvassed in the Doha Round. They show a range of global welfare gain estimates via partial goods

[15] One reason countries put different emphases on the three pillars, and perhaps a reason the EU seeks to downplay the importance of market access, is that a large share of support for its farmers – and most of its food processors – comes from market access barriers. By contrast, domestic support measures are much more important in the United States.

[16] Hoekman, Ng and Olarreaga (2004), using a simpler partial equilibrium framework and extremely detailed information on tariffs plus official WTO data on domestic subsidies, also established the importance of agricultural market access barriers. Their findings were even stronger than the 93 percent result cited above. They found that reductions in domestic support would yield less than one percent of the gains obtainable from reductions in market access barriers.

trade liberalization from less than $20 billion to as much as $120 billion per year. In their 'Pessimistic', minimalist-reform scenario, little more is achieved other than the phase out of farm export subsidies, a modest reduction in agricultural domestic support and, for agricultural and non-agricultural tariffs, a reduction only in 'binding overhang' (the gap between each legally bound tariff and the typically much lower actual tariffs being applied to imports from different trading partners). The key aspect of this scenario is the inclusion of 'sensitive' and 'special' farm product exceptions in the tariff cutting formula, whereby virtually all the items with peak applied tariffs would avoid being cut in both high-income and developing countries. The first column of Table 7 shows that with such a minimalist outcome, developing countries as a group would gain nothing and high-income countries would gain just $18 billion per year by 2015 (in US 2001 dollars). This assumes also that Special and Differential Treatment (STD) is invoked, whereby developing countries cut their bound rates by only two-thirds as much as high-income countries (hence their applied rates by very little, given their high degree of 'binding overhang'), and UN-designated Least Developed Countries (LDCs) don't liberalize at all.

Having exposed the importance of 'sensitive' and 'special' farm product exception in this way, the hope is that negotiators will be more ambitious in the final agreement on agriculture, which in turn would allow a more-ambitious outcome for non-agriculture. When that exceptional treatment for agricultural tariffs is dropped and a 50 percent cut in non-agricultural tariffs is included, the projected developing country gain rises to almost $30 billion per year, and the high-income country gain quadruples (mainly because rich countries would be lowering their applied tariffs on their most protected items such as rice, sugar and dairy products). In this 'central' scenario, the projected global gain is $96 billion per year in 2015, which is 0.2 percent of global GDP.

If developing countries were to not invoke SDT, the probability of reaching a Doha agreement would rise substantially – and developing countries would gain much more, because of greater own-country reform. The final column of Table 7 shows that if developing countries (including LDCs) fully engaged in the sense of cutting their tariffs by the same proportion as high-income countries, their gain in this 'Optimistic' scenario would rise by more than a third above that from the second ('Central') scenario, and the global gains would be almost $120 billion per year (compare columns 2 and 3 of Table 7).

The 'Central' scenario is about mid-way between the various proposals that were on the table before the Doha round went quiet (Martin and Anderson 2006), so it is that one which is chosen as one around which we do benefit/cost analysis below. In July 2007 the Chairs of the Agricultural and the NAMA negotiations provided new texts for members to consider as they try to narrow their differences. True, many developing countries remained cautious about undertaking more liberalization commitments, and the fast track authority for the US President expired on 30 June 2007, so agreement may yet prove elusive or still be some years away. But if a fair compromise between those current positions is reached, it would represent a substantial agreement—much more so than the Uruguay Round Agreement on Agriculture in terms of cuts both in bound tariffs and subsidies and in actual delivered levels of farm protection and support. The potential Doha agreement on non-agriculture in that scenario is substantial too. Moreover, such an outcome on goods trade reform is likely to be accompanied by an as-yet unknown degree of commitment to reform policies affecting markets for services, which would multiply the gains, possibly by several orders of magnitude based on the earlier discussion of results

reported in Table 1. With that in mind, together with the fact that the numbers in Table 2 are generated from a model than does not include increasing returns to scale, imperfect competition, productivity enhancement or dynamics, the 'Central' scenario's benefits (equal to 0.2 percent globally and 0.28 percent for developing countries) should be considered very much lower-bound estimates.

As for an upper bound on comparative static gains, the results in Table 1 suggest it could be as much as nine times greater, depending on the extent to which services trade and investment are also liberalized, on the strength of influence of imperfect competition and economies of scale, and on the extent to which the appropriate counterfactual in 2015 is not just current policies but rather more-protectionist ones in the absence of a robust Doha agreement. To err on the conservative side, we choose an upper bound of five times the lower bound, or 1.0 percent of GDP globally (1.4 percent for developing countries). We also assume that those gains will accrue fully after an eight-year phase-in period from 2008, prior to which the gains will begin in 2008 at one-eighth the full amount as of 2015 and rise by a further one-eighth each year until 2015.

There are dynamic gains from trade to consider in addition to the above comparative static ones. The past experiences of successful reformers such as Korea, China, India and Chile suggest trade opening immediately boosts GDP growth rates by several percentage points per year for many years. A conservative estimate might be that reform boosts GDP growth rates – projected to 2015 by the World Bank (2006) to be 2.7 percent for high-income countries and 4.6 percent for developing countries and so 3.2 percent globally – by one-sixth or 0.45 of a percentage point for high-income countries and by one-third or 1.53 percentage points for developing countries, that is, to 3.15 and 6.13 percent, respectively, and hence from 3.2 to 3.73 percent globally through to 2015.[17,18] For the period after 2015, we assume the boost to growth rates diminishes linearly over time, petering out by 2025 in the low-gain case and by 2050 in the high-gain case. Thereafter there would be no further dynamic benefit in the absence of further reforms, just the continuing comparative static gain of 0.2 percent globally and 0.28 percent for developing countries. This is in line with the summary of the literature provided by Winters (2004), who argues that while the growth increments due to trade liberalisation will be temporary, they could last several decades.

In addition to these contribution to net global benefits, multilateral trade opening also can contribute to reducing inequality and poverty both between and within countries (Hertel and Winters 2006, Hertel et al. 2007). While those are benefits that cannot be incorporated in the standard benefit-cost metric used in this project, they can be thought of as positive externalities that reduce such things as inter- and intra-national social tensions, environmental degradation, malnutrition, and disease, thereby addressing several of the other challenges being considered by the Copenhagen Consensus project.

[17] For years beyond 2015, we assume the developing country real GDP growth rate converges lineally from 4.6 percent to the current global average of 3.2 percent p.a. over the remaining 85 years (while high-income countries continue to grow at 2.7 percent).

[18] Econometric support for the claim that this assumed increase in GDP growth rates is conservative is provided by Romalis (2007), who estimates that the elimination of just import tariffs, and only by high-income countries, would boost annual GDP growth in developing countries by up to 1.6 percentage points. In the model by Rutherford and Tarr (2002), their ten percentage point cut in tariffs led to a rise in the steady-state growth rate of 2 percent p.a. to 2.6 percent over the first decade and 2.2 percent over the first five decades (and even after fifty years their annual growth rate is 2.1 percent).

***Prospective benefits of just removing intra-American trade barriers***

The negotiations to create a Free Trade Area of the Americas (FTAA) – the largest such FTA negotiation currently under way – have run into political problems, so it is not clear if/when they might conclude. The same is true of the negotiations to create an FTA between the European Union and the Southern American countries that are members of Mercosur (see http://ec.europa.eu/external_relations/mercosur/intro/index.htm). It is nonetheless worth considering that type of opportunity so as to point out that the potential global gains from such sub-global FTAs are only a small fraction of those obtainable from multilateral liberalization. Two studies that examine both multilateral reform and the FTAA are the BKS study and a follow-on to the HRT one, by Harrison, Rutherford, Tarr and Gurgel (2004). BKS estimate the gains from the FTAA to be just one-twenty-fourth that from a full multilateral trade liberalization, and for the HRTG study the difference is even greater. The North and Latin American economies are projected to gain (Table 8), although the estimated magnitudes differ considerably between the two FTAA studies – just as they do in Table 1, and for the same reasons. Note, however, that both studies suggest excluded economies in aggregate would be worse off if the FTAA went ahead, as is always possible with sub-global reforms because of trade diversion.

Table 8 also reports broader liberalizations, so as to be able to compare their estimated welfare effects on the Americas and the rest of the world with those that might result from an FTAA. The BKS study shows how much greater would be the gains to the North and Latin American countries if each of them were instead just to adopt free trade unilaterally: North America would be five times better off, and Latin America 2.3 times better off. Even more striking is the effect on the rest of the world: instead of losing slightly as in the FTAA scenario, other regions would gain substantially from unilateral trade reform in the Americas. And then if the unilateral reform extended to the rest of the world (i.e. a move to global free trade), the Americas would be better off by a further 50+ percent (because of also gaining from other regions' reform), while the rest of the world would be five times better off (Table 8(a)).

The HRTG study reported two other variants of broader reform. The first involves adding an EU-Mercosur FTA on top of the FTAA. That reduces substantially the welfare-reducing aspects of the FTAA for Latin America and the EU, but the rest of the world still loses slightly in aggregate. If instead all countries were to liberalize even by just halving their tariffs, the rest of the world would be far better off but Latin America would benefit only half as much because of greater competition/ the loss of preferences into the markets of North America and the EU. The final column of Table 8(b) reports the results from the lower-bound Doha scenario described above. That scenario would involve considerably less liberalization than a 50 percent across the board global reform, especially for developing countries because of the Special and Differential Treatment they have demanded in the form of lesser tariff cuts under the Doha Round, so not surprisingly they are lower than the global 50 percent case. Note, though that they generate much bigger gains than the FTAA plus EU-Mercosur scenario for all but Latin America – and Latin America could alter that simply by committing to open up somewhat more under Doha than may be required of them (e.g., to match the degree of opening up involved in joining FTAs with North America and the EU).

Even if several such large FTAs were to be agreed, their potential contribution to world economic welfare would remain only a fraction of what is potentially achievable via a similar degree of tariff cuts under a multilateral agreement. Furthermore, these FTA studies take no account of the dampening effect of the rules of origin that almost invariably constrain the extent to which firms can take advantage of any FTA's removal of bilateral tariffs (Krueger 1999).

Similarly, studies of Europe's proposed Economic Partnership Agreements (EPAs) with the poor countries of the African, Caribbean and Pacific (ACP) Group almost all anticipate zero gains or actual economic loses from them, at least in static terms.[19] In those studies their authors felt the effects on economic growth generally were too difficult to model formally. One of the very few studies that does offer empirical estimates of the effects of FTAs on economic growth, by Vamvakidis (1999), finds either zero or negative effects.

Of course there is more motivation to forming preferential FTAs than just economic welfare, but that is also true of multilateral agreements. Moreover, the latter have the virtue of being non-discriminatory, of involving much less negotiating cost per dollar of benefit, and of having a far higher probability of no country, nor any significant group of households within each participating country, losing from the agreement – in part because multilateral reform encourages each country to move resources to activities in which the country has its stongest comparative advantages, whereas preferential FTAs may encourage resources to move to now-more-profitable activities which subsequently become uncompetitive following the next FTA or WTO agreement. All this implies the costs of adjusting to an FTA per dollar gained is likely to be far lower for a WTO agreement than for an FTA. And since the probability of an FTAA forming looks even less promising than for concluding a DDA agreement during the next few years, there is no point in formally calculating a benefit/cost ratio for this opportunity.

***Removing developed country barriers to exports from least-developed countries***

The EU's initiative to extend market access preferences to least developed countries (LDCs) provides duty- and quota-free access to the EU for exports of 'everything but arms' (EBA). That initiative received in-principle, best-endeavours endorsement at the WTO Ministerial in Doha in November 2001, but without any specific timetable. A similar initiative has been put forward for providing free market access for all African products (Collier 2007).

Liberal though that proposal sounds, note that it does not include trade in services (of which the most important for LDCs would be movement of natural persons, that is, freedom for LDC laborers to work on temporary visas in the EU or other high-wage countries). Also, a number of safeguard provisions are included in addition to the EU's normal anti-dumping measures. Furthermore, access to three politically sensitive agricultural markets, bananas, rice and sugar, is being phased in by the EU only gradually over this decade – and they are subject to stricter safeguards.

Several empirical studies of the initiative have already appeared. A World Bank study by Ianchovichina, Mattoo and Olarreaga (2001) compares the EU proposal, from the viewpoint of Sub-Saharan Africa (SSA), with recent initiatives of

[19] A small selection of the literature includes: Gasiorek and Winters (2004), Milner, Morrissey and McKay (2005), and UNECA (2007). All find fault with specific aspects of the EPAs but none suggests that correcting these faults would make a dramatic difference to the conclusions.

the United States and Japan. Its GTAP modelling results suggest that even the most generous interpretation of the United States' Africa Growth and Opportunity Act (which they model as unrestricted access to the US for all SSA exports) would benefit SSA very little because the US economy is already very open and, in the products where it is not (e.g. textiles and clothing), SSA countries have little comparative advantage[20]. By contrast, the EU proposal, especially if it were to apply to all Quad countries (the EU, the US, Canada and Japan), would have a sizeable effect on SSA trade and welfare – provided agriculture is included in the deal. Just from EU access alone, SSA exports would be raised by more than US$0.5 billion and SSA economic welfare would increase by $0.3 billion per year (a 0.2 percent boost).[21] The results overstate the benefits of the EU proposal, however, as this World Bank study assumes all SSA countries (excluding relatively wealthy South Africa and Mauritius), not just the LDCs amongst them, would get duty- and quota-free access.

Another World Bank study, by Hoekman, Ng and Olarreaga (2002), uses a partial equilibrium approach and looks at the benefit of the EU initiative for LDCs not just in SSA but globally. It finds that trade of LDCs would increase by US$2.5 billion per year if all Quad countries provided LDCs with duty- and quota-free access on all merchandise.[22] However, almost half of that increase would come as a result of trade diversion from other developing countries. The authors suggest this is trivial because it represents less than 0.1 percent of other developing countries' exports (about $1.1 billion), but precisely because the diversion will be in simple goods that can be produced in LDCs, it will mostly fall on people in other poor countries whose circumstances are hardly better than those in the LDCs.[23] Moreover, if the 48 LDCs are given such preferences, they will become advocates *for* rather than *against* the continuation of MFN tariff peaks for agriculture and textiles – diminishing considerably the number of WTO members negotiating for their reduction. It may be true that MFN reductions in agricultural and textile tariffs would help LDCs much less than it would help other developing countries, as the study by Hoekman, Ng and Olarreaga (2002) finds; but the gains to consumers in the QUAD would be more than sufficient to allow them to increase their aid to LDCs to compensate many times over for the loss of LDC income from the preference erosion that necessarily accompanies MFN reform.

Another cause for concern is that most estimates of the effects of preferences do not take into account that firms are heterogeneous. When preferences and their accompanying rules of origin (ROOs) encourage more capital-intensive production (e.g., to take advantage of volumetric import quotas), they may raise investment and exports but they also bias exports away from less capital intensive activities in which the LDCs have a comparative advantage, and in the process lower average productivity of exporters. Evidence of this in Bangladesh's exports to the US and EU

[20] A more recent *ex post* study of AGOA declares it to have been a success – Frazer and van Biesebroeck (2007). It raised Africa's exports by 0.15% of GDP. As the authors note, this is not insignificant, but, especially for an arrangement whose virtues are much proclaimed, it is a drop in the bucket.

[21] This is very similar to the estimate by UNCTAD/Commonwealth Secretariat (2001, Ch. 3).

[22] This and other estimates of gains from preferential market access provisions need to be discounted to the extent that such things as rules of origin, anti-dumping duties, and sanitary, phytosanitary and other technical barriers limit the actual trade allowed. For a detailed analysis of these types of restrictions on EU imports from Bangladesh in recent years, see UNCTAD/Commonwealth Secretariat (2001, Ch. 5).

[23] The impact outside the LDC group would be far from trivial for Mauritius, however, since the vast bulk of its exports are quota-restricted sales of clothing and sugar to the EU and US. See the discussion in UNCTAD/Commonwealth Secretariat (2001, Ch. 6).

is provided by Demidova, Kee and Krishna (2006). That study finds the firms that take advantage of the less-restrictive ROOs of the EU (as compared with the US) are less productive than the firms that export to the US.

These results suggest the gains from this opportunity for developing countries as a group – or even for just the LDCs amongst them – are meagre at best, and possibly negative in aggregate for developing countries. And as with preferential FTAs, the cost associated with this opportunity are likely to be relatively high because it would encourage resources to move to activities which subsequently become uncompetitive following the next FTA or WTO agreement. Hence this opportunity does not warrant a formal benefit/cost calculus.

***Prospective benefits of freeing up international labor movements***

The challenge in high-income countries of a shortage of low-skilled workers has been eased by merchandise trade with and FDI flows to labor-abundant developing countries, most notably China in the past two decades. But that has been far from sufficient to equalize wages across countries. Historical experience in the 50 years to World War I showed that by far the fastest way to bring about a convergence in living standards is through international migration (Williamson 2002). Notwithstanding the liberalization of much merchandise trade post-World War II, and the opportunity through the WTO's Doha round to reduce those and services trade barriers further, the CGE analyses by Winters et al. (2003) suggest that this will still be the case in the foreseeable future. When coupled with an aging population in high-income countries, there is a compelling case for them to expand their quotas on immigrants from developing countries. Indeed Mattoo and Subramanian (2003) argue that this would be essential if the Doha round is to deliver on its promise of being development-friendly.

None of the studies listed in Table 1 consider the possibility of the services negotiations including provision for more temporary movement of labor (Mode IV in the WTO's General Agreement on Trade in Services, GATS). Yet if trade liberalization in goods and other services proves too difficult politically to achieve in the next few years, the benefits of formally liberalizing international labor flows as a possible substitute for goods trade is worth contemplating – not least because otherwise illegal migration is likely to increase (Hanson 2006). Current immigration laws are very strict, such that labor flows are much less significant across borders than flows of goods, other services and financial capital. Presumably this helps explain why the dispersion of pay for similarly skilled workers across the globe so greatly exceeds the dispersion of prices for goods and financial capital (Freeman 2007). This in turn signals an additional opportunity for reducing inequality and poverty. Freeman discusses some radical policy options for making such a commitment more palatable in receiving countries (e.g., auctioning off visas and using the revenue to compensate any losers among current residents), as does Prichard (2007) in his provocative book *Let Their People Come.* Meanwhile Schiff (2007) explores which policy measure might be optimal among the three options of permanent, guest-worker or GATS Mode IV flows.[24]

An early attempt to measure the gains from freeing international migration was made more than two decades ago by Hamilton and Whalley (1984). Moses and Letnes (2004) have updated that study, and find a reduction in international migration

[24] See also the contribution on migration to the first Copenhagen Consensus project, by Martin (2004).

controls sufficient to reduce the difference between developing country and global wage rates by 10 percent generates a welfare gain of the order of $774 billion per year, in 1998 US dollars (assuming unitary elasticities of substitution in production in all regions).

More recently, the Linkage model used for the above Doha analysis has been used by the World Bank in a study of the potential gains from a one-off expansion over a 25-year period in international migration (World Bank 2006, Chapter 2). That study builds on earlier work by Winters et al. (2003) and draws on a new bilateral migration and remittances database involving no less than 226 countries (Parsons et al. 2007), thereby capturing the past patterns of migration between different countries (including the profile of accompanying family members if any). It simulates the impacts of an increase in migrants per year from developing to high-income countries that accumulates to a 3 percent boost in the latter's labor force (both skilled and unskilled) by 2025, a total of 14.2 million workers and their families coming at the rate of 568,000 extra migrant workers per year over the 25 years beginning in 2001. To put that in context, in 2000 a net total of 2.4 million people migrated from developing to high-income countries (UN Population Division 2002, Table 1). That extra 3 percent gain in the high-income countries' workforce by 2025 represents a loss of merely 0.4 percent to the developing countries' workforce, and even in the developing countries' skilled category it represents only a 1.7 percent loss of workers (final column of Table 9).

That comparative static migration study estimates the global gains by 2025 would amount to $674 billion per year in 2001 US dollars. Of that, $624 billion would be enjoyed by current citizens of developing countries. That includes those who migrate, whose share is estimated to be $481 billion in after-tax income (net of what the model assumes they remit back to their country or origin, based on past bilateral remittance patterns of existing migrants, the average of which is 17 percent of the migrant's earnings). The small residual gain to the host country comprises a non-trivial gain to natives ($138 billion), but a loss to earlier migrants (of $88 billion or 6 percent) because they would face stronger competition in the workplace from the new migrants than would natives (even though the proportional increase in skilled migrant workers is much higher than in unskilled migrants to get the same 3 percent increase in both groups of workers in host countries). That is, their good fortune from being an earlier migrant would be shared somewhat with the newest migrants as the stock of migrants grows (see Table 10).

That comparative static aggregate global gain of $674 billion per year represents just over 1 percent of the projected global income for 2025. We assume the annual migration numbers return to normal after 2025, and that the on-going comparative static gain for the rest of this century from this accelerated program remains at just over 1 percent of global GDP. It is difficult to say how those gains would be shared between groups over a whole century (four generations), but if they were shared in the same proportions between migrants and natives as in 2025 (see final column of Table 10) then most would go to current citizens of developing countries, particularly the migrants themselves. To err on the conservative side, we also assume there are no additional dynamic gains from migration, even though they may well be a similar order of magnitude to those from product trade reform.

That proportional comparative static gain is more than five times the proportional gain reported above for the 'Central' Scenario of the Doha Round. Or to put it another way, if the extent of increased migration was only one-fifth as large (a 0.5 instead of 3.0 percent increase in the recipient countries' labor force by 2025) it

could generate the same proportional comparative static gain as the Doha Round might achieve via goods trade liberalization.

The migration opportunity is of course not necessarily an alternative to the Doha opportunity. Indeed if Doha were to also embrace (as part of a GATS Mode IV agreement) the migration scenario described above, the resulting greater international economic integration would boost the gains from Doha enormously. The additional gains from Doha may not be exactly the sum of the two scenarios, as the net effect would depend on the degree to which product trade is a substitute for this form of 'trade' in labor services. But given the smallness of the proportional changes in the aggregate size and skill composition of the workforce involved in that extra migration shown in Table 9, and the expected complementarity between trade in products and trade in such productive factors (Markusen 1983), adding those net benefits would be a reasonable approximation.[25]

## Quantifying Economic Costs of Reducing Trade and Migration Barriers

The above benefits from reform are not costless of course. And the costs associated with trade reform differ from those associated with migration, so they are considered in turn.

### *Costs associated with Doha trade reform*

Expenditure on trade negotiating, and on supporting policy think tanks and the like to develop and disseminate a convincing case for trade reform, could be expanded many fold before running into declining returns. But even with a substantial expansion in those activities, the overall cost would be trivial compared with the global gains from trade reform (a fraction of 1 percent of the benefits).

Of much more significance are the private costs of adjustment for firms and workers as reform forces some industries to downsize or close to allow others to expand (Matusz and Tarr 2000; Francois 2003). Those costs are ignored in the global CGE models discussed above, where the aggregate employment rate is held constant in each economy.[26]

There are also social costs to consider. They include social safety net provisions in so far as such schemes are developed/drawn on by losers from reform (e.g., unemployment payments plus training grants to build up new skills so displaced workers can earn the same wage as before).

All three types are one-off costs to weigh against the non-stop flow of economic benefits from reform. The private and social costs of adjustment tend to be smaller, the longer the phase-in period or smaller the tariff or subsidy cut per year (Furusawa and Lai 1999). Also, CGE simulation studies suggest that the annual change in an industry's terms of trade due to phased trade reform is typically very

[25] In a recent econometric study of migration to OECD countries, Dolman (2008) finds that countries tend to trade and invest more with countries from which they have received more migrants, especially if there are large language and other characteristics that distance those countries – and those greater trade and especially investment flows are not at the expense of flows with other countries.

[26] Incorporating adjustment activities, such as worker retraining, appear to be of small, second-order importance in CGE modelling if the government is able to make credible policy commitments (Karp and Paul 2005) – which it is in the case of multilateral reform agreements under the WTO.

minor relative to changes due to exchange rate fluctuations, technological improvements, preference shifts and other economic shocks and structural developments associated with normal economic growth (Anderson et al. 1997).

Estimates of the magnitude of those costs are difficult to generate, but all available estimates suggest they are minor relative to the benefits from reform. An early study by Magee (1972) for the United States estimated the cost of job changes including temporary unemployment to be one-eighth of the benefits from tariff and quota elimination initially. Even assuming that transition took as many as five years, he estimated a benefit/cost ratio of 25. A subsequent study which examined a 50 percent cut in US tariffs (but not quotas) came up with a similar benefit/cost estimate (Baldwin, Mutti and Richardson 1980). In more recent debates about trade and labor, analysts have had difficulty finding a strong link between import expansion and increased unemployment (see Greenaway and Nelson 2002). One example is a study of the four largest EU economies' imports from East Asia (Bentivogli and Pagano 1999). Another European example is a study of the UK footwear industry: liberalizing that market would incur unemployment costs only in the first year, because of the high job turnover in that industry, and those estimated costs are less than 1.5 percent of the benefits from cutting that protection (Winters and Takacs 1991). A similar-sized estimate is provided by de Melo and Tarr (1990) using a CGE model that focuses just on US textile, steel and auto protection cuts and drawing on estimates of the cost of earnings lost by displaced workers (later reported by Jacobson, LaLonde and Sullivan 1993).

For developing countries also the evidence seems to suggest low costs of adjustment, not least because trade reform typically causes a growth spurt (Krueger 1983). In a study of 13 liberalization efforts for nine developing countries, Michaely, Papageorgiou and Choksi (1991) found only one example where employment was not higher within a year. A similar study for Mauritius by Milner and Wright (1998) also found trade opening to be associated with employment growth rather than decline.[27] A survey of 18 Latin American countries for the period 1970 to 1996, by Marquez

[27] A further impact of trade policy reform about which concern is often expressed is the loss of tariff revenue for the government. This is of trivial importance to developed and upper middle-income countries where trade taxes account for only 1 and 3 percent of government revenue, respectively. For lower middle-income countries that share is 9 percent, and it is more than 20 percent for more than a dozen low-income countries for which data are available, so how concerned should those poorer countries be? The answer depends on whether/how much that revenue would fall and, if it does fall, on whether/how much more costly would be the next best alternative means of raising government revenue. On the first of those two points, government revenue from import taxes will rise rather than fall with reform if the reform involves replacing, with less-prohibitive tariffs, any of import quotas or bans, or tariffs that are prohibitive (or nearly so) or which encourage smuggling or under-invoicing or corruption by customs officials. It is possible even in a tariff-only regime that lower tariffs lead to a sufficiently higher volume and value of trade that the aggregate tariff collection rises. Examples of recent trade policy reforms that led to increased tariff revenue are Chile and Mexico (Bacchetta and Jansen 2003, p. 15) and Kenya (Glenday 2002). See also Greenaway and Milner (1993) and Nash and Takacs (1998). Since the economy is enlarged by opening up, income and consumption tax collections will automatically rise too. On the second point, about the cost of raising government revenue by other means if tax revenue does fall, Corden (1997, Ch. 4) makes it clear that in all but the poorest of countries it will be more rather than less efficient to collect tax revenue in other ways. Even countries as poor as Cambodia have managed to introduce a value added tax. Hence from a global viewpoint there is no significant cost that needs to be included in response to this concern. To the extent subsidies are also cut as part of the reform, the chances of government revenue rising are even greater. Income and consumption tax revenue also will rise as the economy expands following reform. In any case CGE modellers typically alter those other tax rates when trade tax revenues change so as to keep the overall government budget unchanged.

and Pages (1998), found some increases in short-term unemployment, but mainly in countries where the real exchange rate appreciated as a result of capital inflows that had accompanied the reforms. That small short-term negative effect soon reversed as production became more labour intensive following reform, according to studies by Moreira and Najberg (2000) for Brazil and de Ferranti et al. (2001) for a wide range of Latin American and Caribbean countries over the 1990s.

If the adjustment costs are so small and may lead to more rather than less jobs even during the adjustment period, why are governments so reluctant to open their economies? The reason is because the anticipated losses in jobs and asset values are very obvious and concentrated whereas the gains in terms of new job and investment opportunities are thinly spread, are less-easily attributed to the trade reform, and are taken up often by people other than those losing from the reform.[28] As discussed above, the few losers are prepared to support politicians who resist protection cuts, while the gains are sufficiently small per consumer and unassisted firm as to make it not worthwhile for those many potential gainers to get together to lobby for reform, particularly given their greater free-rider problem in acting collectively (Olsen 1965). Thus reform has political, and possibly employment, costs for politicians and one should not under-estimate the difficulties of political action to reduce/eliminate them. We do not factor these into the economic cost/benefit analysis for society as a whole, however, because they are not of a comparable form and the purpose of the Copenhagen Consensus is to contribute to their erosion (if deemed appropriate by the panel).

A prime example of the role analysis can play has to do with effects on developing countries in reforms to support for agriculture in OECD economies. The primary channel for such effects is through the terms of trade, which in turn depend in part on whether a country is a net exporter or importer of the affected OECD products. Long-term support for agriculture in OECD countries, coupled with often-negative assistance to farmers in many developing countries, has left developing countries as a group dependent on imports of these subsidized products. As a result, an across-the-board cut in all domestic support for OECD agriculture leads to welfare losses for many developing countries and to declines in farm incomes in Europe, Japan and North America. Such a reform package is therefore unlikely to be implemented on its own. An alternative approach is to focus on broad-based reductions in market price support, as has begun occurring in the EU where domestic support has increasingly replaced border measures. As Dimaranan, Hertel and Keeney (2004) show, a shift from market price support to land-based payments could generate a win-win-win outcome whereby OECD farm incomes are maintained and yet world price distortions are reduced and economic welfare rises for most developing countries and globally. Provided these increased domestic support payments are not linked to output or variable inputs, the trade-distorting and welfare-reducing effects are likely to be small, thereby providing an effective way of offsetting the potential losses that would otherwise be sustained by OECD farmers. This type of policy re-instrumentation increases the probability that such reforms are politically acceptable in the reforming economies while simultaneously increasing the likelihood that they will be beneficial to developing countries.

[28] In the Australian context of high unemployment in the latter 1970s, Max Corden was prompted to write a deliberately non-technical paper called 'Tell us where the new jobs will come from?' because he knew the answer was not obvious to non-economists (Corden 1979). The paper proved so popular that thousands of offprints were distributed and in 1985 it was reprinted in *The World Economy*.

The existing estimates of the adjustment costs to trade reform are very small, but they are concentrated on particular individuals and so perhaps deserve large weight socially. It is certainly possible that those estimates omit some elements too, such as the disutility of one-off uncertainty and disruption experienced by everyone in adjusting to policy changes.[29] Hence, so as not to exaggerate the net gains from a Doha trade reform, it is assumed here that there would be an adjustment period of eight years following the beginning of liberalization (assumed to be 2008), and that in each of those years the adjustment costs would be 15 percent of the annual comparative static benefits as of 2015 (and zero thereafter) in the high case, and 5 percent in the lower-bound case when much less adjustment would be needed. For the high case that amounts to $71 billion per year during 2008 to 2015 globally, of which $24 billion is expended in developing countries, when expressed in 2005 US dollars by using the projection to 2015 of global GDP provided by the World Bank (2006). For the lower-bound case the costs would be one-third of those values.

***Costs associated with increased international migration***

The migration opportunity also would involve costs. There are the direct one-off costs to migrants of obtaining visas and work permits, transport and transitional expenses, costs of searching for housing, schooling, employment, etc. upon arrival, as well as the emotional cost of separating from extended family and in some cases temporarily breaking up the nuclear family. There are also one-off costs to the host-country government of processing applications and providing initial help with housing, welfare payments and the like.

In terms of adjustment costs in the workplace, in so far as migrants are attracted or recruited to positions for which there is excess demand, they will be reducing underemployment of capital in those industries. Since that is a significant part of the motivation for host countries seeking migrants, especially as their native population is aging rapidly, this may well offset the other costs associated with migration – especially if the skill mix and timing of immigration flows are designed to alleviate such labor shortages. However, to err on the conservative side for the purpose of calculating benefit/cost ratios, it is assumed here there are net costs involved for both the migrants and the host governments' taxpayers.

Fees charged by private recruitment agencies offer evidence of part of the direct cost of migration to migrants. The World Bank (2006, Table 3.1) cites several studies within the range $700 to $1,700, but one for Thais emigrating to Japan of more than $8,000. Such studies may overstate the true cost of the services actually offered, however, insofar as the agency is able to capture also some of the lifetime benefits expected by the migrant (Abella 2004).

For present purposes, in the absence of reliable estimates of overall costs it is necessary to rely on using a range of guesses. Our low guesstimate is that each migrant worker (and his family) spends on average $7,000 in 2001 US dollars to migrate in the year of migration. To err on the conservative side and allow for significant social costs associated with increased immigration and emigration we have chosen, for the high-cost case, combined costs of three times the low-cost ones, or $21,000 per worker and family in the year of migration. The same-sized average costs

[29] We should be explicit that we cannot take the distributional dimensions into account more formally in this aggregate analysis, but they obviously matter in the real world. A detailed discussion of the effects of trade liberalisation on poverty is given by Winters (2002) and Winters, McCulloch and McKay (2004).

are assumed also to be borne by the host country government (a low of $7,000 and a high of $21,000 in the year of migration). These are generous cost estimates, to allow for the fact that some migrants may draw social welfare benefits beyond their first year. But we assume that after the first year migrants subsequently become fiscally neutral on average in the sense that the cost of public services they receive after settling is just equal to the income tax they pay.

## Net Benefits and Benefit/Cost Analysis

With these numbers fed into a spreadsheet, it is possible to graph the flow of annual net benefits from the various scenarios. A sample of these from 2008 through to 2100 are presented in Figures 1 and 2 in terms of annual increments to GDP (not the difference in levels). In each case we refer to the 'high net gains' scenarios. Figure 1 shows the Doha scenario and the scenario with extra migration, as well as the undiscounted base projection of GDP increments each year in the world and in developing countries (the dark lines). Were the Doha partial reforms to be phased in over an eight-year period beginning in 2008, our 'central' scenario including dynamic gains projects those GDP increments in the world and in developing countries to follow the higher dashed lines in Figure 1. Given the higher GDP growth rate assumed for developing than developed countries over this century, it is not surprising that by 2100 those countries would be enjoying an even larger share of those global gains from trade reform than in the earlier years – although many of them would by then have joined the 'high-income country' club. The net benefits in Figure 1 are not discounted back to present-value terms. To see the impact that discounting has, Figure 2 reports the net present value data using the higher (6 percent) discount factor.

Three key points are worth stressing about the depicted numerical simulation results. First, from a global viewpoint the gains from extra migration exceed those from trade reform in the early years, but over the long term the comparative static gains from a Doha trade reform are similar in magnitude to those from the extra migration scenario.

Second, the dynamic gains from trade reform can be seen clearly from Figure 2 to be many times greater than the comparative static gains. There may well be dynamic gains from extra migration too, although to err on the conservative side we have not included them in this simulation exercise.

Third, from the viewpoint of current citizens of just developing countries (including its extra-emigrants-to-be), they would reap the vast majority of the global gains from extra migration and those gains to them would far exceed at least the comparative static gains to them from a Doha trade reform that excluded greater temporary migration of labour. That suggests an extra flow of migrants to today's high-income countries probably would have a stronger egalitarian, pro-poor distributional outcome in favour of current developing country citizens then just allowing more products to be traded.

The range of present-value benefits and costs for the low- and high-gain cases, using both 3 and 6 percent as the discount rate to bring the net benefit flows back to the present (2008), are summarized in Table 11. In all cases the benefits are estimated through to the year 2100, and they and the up-front costs continue to be expressed in 2001 US dollars.

In the Doha trade reform scenarios, the 'low gains' case refers to global comparative static gains of just 0.2 percent of GDP while the 'high gains' case refers

global gains five times that lower benefit. In present value terms the net benefit of a 'central' Doha outcome ranges from $42 trillion to $113 trillion at the higher discount rate and about four times that at the lower discount rate. The costs range from $50 billion to $450 billion in present value terms, but they are mostly private rather than government costs and are dwarfed by the gross benefits. Today's developing countries reap the majority of those net gains, as their share of the global economy is assumed to grow throughout this century (although at a progressively slower rate after 2015). Their benefit/cost ratios from the trade reform opportunity offered by the Doha round are between 690 and 900 in the higher discount rate case and between 2700 and 3100 in the lower discount rate case. This is clearly an extremely high payoff activity, if only the political will to bring about a successful conclusion to the Doha round can be found.

If for political reasons the Doha round cannot be brought to a successful conclusion, high-income country governments still have the opportunity to boost their intakes of migrant workers from developing countries. In the migration scenarios, the low-cost ('high net gains') case refers to one-off costs of just $14,000 per worker and family (shared equally by the migrants and the host government). For the high-cost ('low net gains') case, combined costs of three times the low-cost ones are assumed, or $42,000 per worker and family in the year of migration. In present value terms the global net benefit of that increased flow of migrants for 25 years is shown in Table 11 to be $13 trillion at the higher discount rate and $38 trillion at the lower discount rate. Since costs are so small compared with benefits, the benefit/cost ratios for developing country citizens are again very high, ranging between 100 and 840. This too is without doubt a very high payoff, and one that does not even require multilateral agreement – it simply requires greater benevolence on the part of developed country citizens and their national governments.

## Social and Environmental Benefits and Costs of Reducing Trade and Migration Barriers

Because trade reform generates large and on-going economic gains while incurring comparatively minor one-off adjustment costs, it would allow individuals and governments the freedom to spend more on other pressing problems, thereby *indirectly* contributing to the alleviation of other challenges facing society.[30] But in addition, trade reform would also *directly* alleviate some of those challenges. This section first focuses on the impact of trade reform on poverty alleviation, since that is the solution to many of the world's problems. It then turns to trade reform's impact on the environment, before briefly commenting on its impact on several of the other specific challenges being addressed in this project, namely, communicable diseases, conflicts, under-investment in education, corruption, and malnutrition and hunger. The social impacts of migration are briefly canvassed also.

### *Poverty alleviation*

Evidence presented by Dollar and Kraay (2002), Sala-i-Martin (2006) and others, and carefully surveyed in Ravallion (2006), suggests aggregate economic growth

[30] On the intrinsic benefits of freedom of opportunity and action that freer markets provide people, apart from their positive impact in boosting income and wealth, see Sen (1999).

differences have been largely responsible for the differences in poverty alleviation across regions. Initiatives that boost economic growth are therefore likely to be helpful in the fight against poverty, and trade liberalization is such an initiative. But cuts to subsidies and trade barriers also alter relative product prices domestically and in international markets, which in turn affect factor prices. Hence the net effect on poverty depends also on the way those price changes affect poor households' expenditure and their earnings net of remittances. If the consumer and producer price changes (whether due to own-country reforms and/or those of other countries) are pro-poor, then they will tend to reinforce any positive growth effects of trade reform on the poor.

The effects of trade reform on global poverty can be thought of at two levels: on the income gap between developed and developing countries, and on poor households within developing countries. On the first, the CGE estimates surveyed above suggest that current developing countries, which produce just one-fifth of global GDP, would enjoy nearly half of the net present value of the global static plus dynamic gains from reducing trade barriers. Clearly that will lower substantially the income gap between developed and poorer countries on average.

How poor households *within* developing countries are affected is more difficult to say (Winters 2002; Winters, McCulloch and McKay 2004). What is clear from Table 4 is that the agricultural policies of developed countries provide a major source of developing country gains from reform, and lowering barriers to textiles and clothing trade also is important. Both would boost the demand for unskilled labor and for farm products produced in poor countries. Since two-thirds of the world's poor live in rural areas and, in least-developed countries, the proportion is as high as 90 percent (OECD 2003a, p. 3), and since most poor rural households are net sellers of farm labor and/or food, one would expect such reforms to reduce the number in absolute poverty. A set of analyses reported in Hertel and Winters (2006), in which GTAP and national CGE model results are carefully combined with household income and expenditure survey data for more than a dozen developing countries, tests this hypothesis and finds strong support for it in most of the country case studies considered.

The evidence on international migration's impact on global poverty is overwhelmingly positive. That is not to say that every small developing country will have less poverty if migration is freed up, because it will depend on the skill mix of the migrants and the extent of remittances they send back, among other things; but in most cases the findings are unequivocal (World Bank 2006, Ch. 3).

### *The environment*

The effects of trade reform on the environment have been the focus of much theoretical and empirical analysis since the 1970s and especially in the past dozen or so years (Copland and Taylor 2003; Beghin et al. 2002). Until recently environmentalists have tended to focus mainly on the *direct* environmental costs they perceive from trade reform, just as they have with other areas of economic change.[31] That approach does not acknowledge areas where the environment might have been *improved*, albeit indirectly, as a result of trade reform (e.g., from less production by pollutive industries that were previously protected). Nor does it weigh the costs of any

[31] See the critique by Lomborg (2001).

net worsening of the environment against the economic benefits of policy reform of the sort described above.

The reality is that while the environmental effects of reform will differ across sectors and regions of the world, some positive and some negative, there are many examples where cuts to subsidies and trade barriers would reduce environmental damage (Anderson 1992; Irwin 2002, pp. 48-54). For some time the OECD has been encouraging analysis of these opportunities (OECD 1996, 1997, 1998, 2003b). Environmental NGOs are increasingly recognising them too. They and the better-informed development NGOs seem to be coming to the view that the net social and environmental benefits from reducing subsidies and at least some trade barriers may indeed be positive rather than negative, and that the best hope of reducing environmentally harmful subsidies and trade barriers is via the WTO's multi-issue, multilateral trade negotiations process (see, e.g., Cameron 2007).

If there remains a concern that the net effect of trade reform on the environment may be negative nationally or globally, that should be a stimulus to check whether first-best environmental policy measures are in place and set at the optimal level of intervention, rather than a reason for not reducing trade distortions. This is because if they are so set, we would then know that the direct economic gains from opening to trade would exceed society's evaluation of any extra environmental damage, other things equal (Corden 1997, Ch. 13).

Much environmental damage in developing countries is a direct consequence of poverty (e.g., the slash-and-burn shifting agriculture of landless unemployed squatters). In so far as trade reform reduces poverty, so it will reduce such damage. More generally, the relationships between per capita income and a wide range of environmental indicators have been studied extensively. Because richer people have a greater demand for a clean environment, income rises tend to be associated with better environmental outcomes once incomes rise above certain levels.[32] Even though more pollutive products are being consumed as incomes rise, many abatement practices have been spreading fast enough to more than compensate. And openness to trade accelerates that spread of abatement ideas and technologies, making their implementation in developing countries affordable at ever-earlier stages of development.

Estimating the global cost to society of all environmental damage that might accompany a reduction in subsidies and trade barriers, net of all environmental gains, is extraordinarily difficult both conceptually and empirically.[33] In the absence of any sufficiently comprehensive estimates it will be assumed that the net effect of reform on the environment would be zero.

When the environmental impact is global rather than local, as with greenhouse gases and their apparent impact on climate change, international environmental agreements may be required (see Cline 2004b). When developing countries are not

[32] This is the theme of the recent book by Hollander (2003). For statistical evidence of the extent to which different environmental indicators first worsen and then improve as incomes rise (sometimes called the environmental Kuznets curve), see the special issue of the journal *Environment and Development Economics*, Volume 2, Issue 4 in 1997 and the more-recent papers by and cited in Harbaugh, Levinson and Wilson (2002) and Cole (2003).

[33] A beginning nonetheless is being made, with several governments funding ex ante evaluations of the WTO Doha round's potential impact on the environment. The EU's efforts include a workshop on methodological issues which are laid out in CEPII (2003), and further work has been contracted to the University of Manchester whose progress can be traced at http://idpm.man.ac.uk/sia-trade/Consultation.htm. Ex post analyses are also being undertaken by NGOs. See, for example, Bermudez (2004) for WWF's sustainability impact assessment of trade policies during 2001-03.

party to such agreements, however, it is difficult to prevent 'leakage' through a re-location of carbon-intensive activities to those non-signatories. An alternative or supplementary approach that is likely to achieve at least some emission reductions, and at the same time generate national and global economic benefits rather than costs, involves lowering coal subsidies and trade barriers. Past coal policies have encouraged excessive production of coal in a number of industrial countries and excessive coal consumption in numerous developing countries including transition economies. Phasing out those distortionary policies has both improved the economy and lowered greenhouse gas emissions globally – a 'no regrets' outcome or win-win Pareto improvement for the economy and the environment (Anderson and McKibbin 2000). Additional opportunities for reducing greenhouse gases through cutting energy subsidies are pointed to in the UNEP study by von Moltke, McKee and Morgan (2004).

### *Communicable diseases*

Communicable diseases are more common among the poor, so again trade reform's contribution to poverty alleviation will in turn impact on human health in general and the reduced incidence of diseases in particular. Furthermore, the greater openness of economies ensures medicines and prevention technologies are more widespread and cheaper, particularly following the Doha WTO conference of trade ministers and the subsequent Decision of 30 August 2003 on the TRIPS Agreement and Public Health. That Decision by the WTO General Council ensures developing country governments can issue compulsory licenses to allow other companies to make a patented product or use a patented process under licence without the consent of the patent owner, while developing countries unable to produce pharmaceuticals domestically can now import generic copies of patented drugs made under compulsory licensing by other developing countries.

### *Conflicts*

Openness tends to break down the common prejudices that accompany insularity, and to broaden mutual understanding between people with different cultures and customs. It also expands economic interdependence among countries, which raises the opportunity cost of entering into conflicts with trading partners. In so far as it reduces income inequality across countries, then that too may diffuse tension between nations – a point that has even greater significance following the terrorist attacks of 11 September 2001. Indeed there is now statistical support for Immanuel Kant's hypothesis that durable peace is supported by representative democracy, trade, and membership of international organizations: Oneal and Russett (2000) find that all three contribute independently to more peaceful relationships with other countries.[34] And casual observation suggests that more-autarchic economies tend to be less democratic.

Where openness involves also greater international migration, there tends to be less inter-cultural conflict and more social gains from multiculturalism. Conversely, it is in societies that resent immigrants and impose strict migration quotas where cultural clashes seem to be more common. Clashes between ethnic groups are

[34] A recent survey of the evidence did not find a significant direct link between poverty and terrorism, however. Rather, Krueger and Maleckova (2003) concluded that terrorism was more a response to political conditions and long-standing feelings of indignity and frustration.

also more common where a minority prospers greatly relative to the majority or other significant minorities (Chua 2003). Such income and wealth inequality within a country tends to be less common the more open is the economy, at least after the initial adjustments to reform (Williamson 2002).

While many of these types of empirical studies struggle to clarify the direction of causation, and so their results need to be treated with caution, the weight of evidence nonetheless lends support to the view that greater openness can contribute to lessening conflict.

***Education under-investment***

Parents and governments are less likely to under-invest in education the higher their incomes, other things equal. So to the extent that trade reform raises incomes, it contributes to better educational outcomes. That is especially so for the very poorest who cannot afford even primary education: a slight increase in the cash income of poor farm families, for example following a reform-induced increase in international prices of farm products, can make it possible to pay the (often relatively high) school fees that are otherwise unaffordable.

If immigration restrictions are eased, the private incentive to invest in education in developing countries would increase even more. This offsets – at least partially but possibly more than fully – the brain drain concern often raised about emigration. It also would help to offset any reduction in the skill premium in wages in developing countries that may follow from liberalization of trade in goods.

***Poor governance and corruption***

A tolerance for subsidies and trade barriers breeds rent-seeking by special interests seeking protectionist policies for their industry. If those policies include import licensing, that breeds corruption through encouraging bureaucrats responsible for allocating licences to accept bribes from would-be importers. Together those activities ensure that the welfare costs of trade barriers are higher than is typically measured, since a share of the private rents they generate is wasted in these lobbying activities. Tax-avoiding corruption is also encouraged in the case of import tariffs, for example through bribing customs officers or through smuggling. For these reasons it is not surprising that statistical analysis has found less-open economies to be more corrupt (Ades and Di Tella 1999).

***Malnutrition and hunger***

Food security is always a great concern in poor countries, especially those dependent on food imports where there are fears that reducing agricultural subsidies and protectionism globally will raise the price of those imports. But food security is defined as always having access to the minimum supply of basic food necessary for survival, so enhancing food security is mainly about alleviating poverty. That suggests this issue needs to be considered from a household rather than national perspective. And the discussion above argues that poverty is more likely than not to be alleviated by cuts to trade and immigration barriers.

Hunger and under-nutrition can be eased by trade not only in goods but also in agricultural technologies, in particular newly bred varieties of staple crops. The introduction of high-yielding dwarf wheat and rice varieties during the Green

Revolution that began in Asia in the 1960s is a previous case in point, whereby producers and consumers shared the benefits in terms of higher farm profits and lower consumer prices for cereals. A prospective case in point is the possibility of breeding crop varieties that are not only less-costly to grow but are 'nutriceuticals' in the sense they contain vitamin and mineral supplements. The most promising is so-called 'golden rice'. Consumers in many of poor countries suffer from chronic vitamin A deficiency that can lead to blindness, weakened immune systems, and increased morbidity and mortality for children and pregnant and lactating women. Golden rice has been genetically engineered to contain a higher level of beta-carotene in the endosperm of the grain and thereby provide a vitamin A supplement. By being cheaper and/or more nutritionally beneficial, it would improve the health of poor people and thereby also boost their labor productivity. Anderson, Jackson and Nielsen (2005) estimate that the latter economic benefit from this new technology could be as much as ten times greater than just the traditional benefits of lower production costs – not to mention that poor people would live longer and healthier lives. This new technology has yet to be adopted, however, because the European Union and some other countries will not import food from countries that may contain genetically modified organisms (GMOs) – even though there is no evidence that GM foods are a danger to human health (see, e.g., King 2003). The cost of that trade barrier to developing countries – which is not included in the estimates in Table 1 – has been very considerable (Anderson and Jackson 2005).

***Social aspects of migration***

Notwithstanding the economic gains that could result from more international migration, and the desire by millions more people in developing countries to migrate (as witnessed by the huge queues of applicants in embassies, the rise in illegal immigration, the increase in asylum seekers, and the high fees paid by recruiters and people smugglers), governments of rich countries are reluctant to open up greatly. Migration has much broader implications for society than opening up to trade in products or financial capital. While many of those implications are positive for both sending and receiving countries, others are perceived as negative. The implications of increased diversity in the destination countries are especially complex and virtually impossibly to include adequately in an economic benefit/cost calculus. Cooperation between the two sets of countries can ease some of the concerns though, especially if they result in agreements that provide for temporary migration and the enforcement of laws that protect migrants from exploitation and abuse.

## Caveats

Measuring both the benefits and the costs of liberalizing subsidies and barriers to trade and migration is still an inexact science, despite the huge amount of progress that has been made over the past two decades in global CGE modelling.[35] We have tried to accommodate shortcomings by providing a range of estimates and by erring on the conservative side in the above analysis. Nonetheless it is worth reviewing the key areas where analytical improvements are still needed. On the cost side, more empirical research on the real costs of adjustments to trade policy changes and of

[35] Parts of this section draw on the survey by Francois and Martin (2007).

international migration, and how they are spread over time for different groups, would be helpful. On the benefit side, economists have made more progress but plenty of scope remains for further improvements, particularly on the size and longevity of dynamic gains from trade reform. Key areas, discussed in turn below, are the assumed policy counterfactual, the tariff aggregation issue, product quality differences, new products, measurement of distortions in markets for service products, and behaviour of labor markets particularly in response to changes in restrictive immigration policies.

***The protection counterfactual***

The standard approach used in evaluating the consequences of international trade agreements is to compare the agreed tariff binding with the previously applied tariff rate, and to treat the post-agreement tariff rate as the lesser of the two rates. This essentially involves treating the current applied rate as a deterministic forecast of future protection rates in the absence of the agreement.

There are two potentially serious problems with this specification of the counterfactual. One is that the trend rate of protection responds systematically to underlying determinants that evolve over time. The second is that annual protection rates fluctuate substantially around that trend. Taking account of either or both of these counterfactuals can have large impacts on the estimated benefits of international trade liberalization agreements.

Anderson and Hayami (1986) and Lindert (1991) provide insights into the likely evolution of agricultural trade policies in the absence of international agreements. Key findings include a strong tendency for agricultural protection to rise with economic development because of fundamental changes in the structure of the economy. In particular, there is a tendency for agricultural protection to be low or negative in very poor countries because the number of farmers is large and it is difficult for them to organize to apply pressure on governments. Because farmers are mainly subsisting at that stage, their real incomes are not greatly affected by increases in farm output prices. By contrast, the urban population in a poor country is far smaller and easier to organize, and food is an important part of consumer budgets.

As economies develop, however, all of these economic factors change in ways that shift the political-economy balance more towards agricultural protection. Farmers become fewer in number and find it easier to organize themselves. They also become more commercial in orientation, so that their real incomes are more strongly influenced by agricultural output prices. At the same time, the urban population becomes larger and hence harder to organize, and the importance of food in consumer budgets and hence in real wage determinations declines. The end result can be a very rapid increase in agricultural protection rates in high-growth economies. Without the new discipline of the Uruguay Round's Agreement on Agriculture, agricultural protection rates in Europe and Northeast Asia may well have kept rising over the past 15 years, and may continue to rise in fast-growing middle-income countries whose tariff and subsidy bindings in WTO are still well above applied rates (Anderson 2006).

Also striking is the large variation in national rates of agricultural protection over time. This is because trade and subsidy policies are frequently used also to stabilize domestic agricultural prices in the face of variations in world prices (Tyers and Anderson 1992). The value of legal bindings on those policies via trade agreements, even when the bindings are well above applied rates at the time of the

agreement, is non-trivial and yet is not captured in most models because those models are not stochastic. As Francois and Martin (2004) show, even bindings that are set well above average rates of protection may greatly diminish the costs of protection when international prices peak. They estimate, for example, that the European tariff binding on wheat, at 82 percent, reduced the cost of protection to this commodity by almost a third, despite being substantially above the average rate of protection prevailing during the preceding 15 years for which data were available. This suggests our current CGE models are understating the gains from tariff and subsidy bindings, particularly for farm products.

### *Aggregation of protection*

Trade barriers vary enormously across commodities, and frequently also across suppliers thanks to regional and other preferential trade agreements. This variation in rates of protection increases the cost of any given 'average' level of protection, since the cost of protection increases with the square of the rate of protection. Necessarily, some degree of aggregation is unavoidable in modelling the real world because the available information on the structure of production and consumption is at a higher level of aggregation than information on tariffs and trade. Further aggregation is employed for computational reasons in a world of more than 225 countries, thousands of product tariff lines, many different occupations and skill levels in labor markets, etc. And additional problems are introduced by the typical approach to aggregation of trade barriers, namely, using averages weighted by external trade: as protection rates rise, the weights associated with these measures decline, which means that a tariff that completely blocks trade has the same measured impact as a zero tariff.

The modern approach to tariff aggregation provides a possible means of dealing with the aggregation problem. Anderson and Neary (1992) have developed a single tariff aggregator that captures the welfare impacts of a non-uniform tariff. Building on this approach, Bach and Martin (2001) use a tariff aggregator to capture the impacts of changes in the tariff regime on the expenditure required to achieve a given level of utility, and another to capture the impact on tariff revenues. Manole and Martin (2005) provide closed-form measures of these aggregators for the widely-used constant-elasticity-of-substitution functional form. Applying these procedures to a sample of seven developing countries, they find that appropriate aggregation increases the estimated cost of protection on average twenty-fold relative to the cost estimated using a weighted average tariff.

The problems of aggregation are particularly intense in agriculture because of the enormous variation in rates of protection across countries and commodities, especially among the industrial countries. Simple solutions, such as the representative-weighting approach used in some versions of the MAcMAP database (Bouet et al. 2004), deal with the weighting problem without addressing the aggregation bias problem associated with nonlinearity in the costs of individual tariffs. In a recent paper, James Anderson (2006) proposes a new aggregation method that deals with both the aggregation bias and weighting problems while maintaining global payment balances, allowing it to be applied in future global CGE models.

### *Product quality and variety differences*

A separate aggregation issue has to do with the fact that, within any product classification, there is a wide range of qualities and varieties available. The only way

product quality or variety differences enter most CGE models is by distinguishing between a product's country of origin. This is done using so-called Armington elasticities which can ensure domestically produced goods are imperfect substitutes for imported goods in aggregate, and imports from one country are an imperfect substitute for goods imported from any other country (Armington 1969).

In the real world, however, there is an ever-increasing array of qualities and varieties available for any product from each supplying country. It appears consumers (including producers using those products as intermediate inputs) are willing to pay for a greater variety of different quality products, even though that product differentiation may be costly in terms of shorter production runs and more advertising. Hummels and Klenow (2005) suggest that these improvements in quality are sufficiently rapid that the prices received by countries for the products that they continue to export—as distinct from their new exports—actually rise by 0.09 percent for each increase of 1 percent in national income. This result is strikingly at variance with traditional Armington models, which generate a reduction in export prices when economies grow and exports expand.

Feenstra, Markusen and Zeile (1992) suggest the welfare cost of tariff protection can be underestimated by as much as a factor of ten when this consideration is not included in the analysis. Further evidence of the importance of this issue is provided by Broda and Weinstein (2006). In a study of US import data from 1972 to 2001, they find that the upward bias in the conventional import price index, because of not accounting for the growth in varieties of products, is approximately 1.2 percent per year, and estimate that the welfare gain from variety growth in US imports is 2.8 percent of GDP. Both computational capability and data improvements are needed before this can issue can be dealt with comprehensively in global CGE models.

***The emergence of new products***

Standard models used to assess the implications of trade reforms are based on the assumption that expansion of exports following liberalization involves increasing the volume of the products initially being exported, but not of any other products. The Armington assumption also rules out expanding the markets to which goods are being supplied: if exports to a particular country are initially zero, then in most CGE models they remain zero following reform.

Recent research, however, highlights the key role of the "extensive" margin, where export expansion involves increases in the range of products exported (Hummels and Klenow 2005) and expansion in the range of markets supplied (Evenett and Venables 2002). Hummels and Klenow conclude that only about one-third of the export expansion associated with economic growth comes from the "intensive margin" where greater quantities of the same products are exported. And Evenett and Venables find that about one-third of the expansion of exports from developing countries was obtained by exporting products to countries to which they had not previously exported.

In a world where importers exhibit a preference for variety in the goods they purchase, these observations on the importance of extensive-margin growth have major implications. Increasing the volumes of the same products, as under the Armington assumption, has the inevitable consequence of driving down the price of exports and causing income losses to the exporter from deterioration in the terms of trade. Where exports are characterized by an expansion in the range of products

supplied, the preference for variety exerts a counteracting force—helping to increase the demand for exports. In simulations introducing the Hummels-Klenow preference for variety in exports from China and India, Dimaranan, Ianchovichina and Martin (2007) found that the terms of trade for these exporters need not deteriorate significantly, despite very high projected rates of export growth.

Some traditional treatments of new varieties, such as those based on monopolistic competition and a love-of-variety inspired by Krugman (1980), are typically implemented with agriculture and services as perfectly competitive sectors and the rest of the economy characterized as monopolistically competitive. However, as Rodrik (2004) notes, the process of discovering efficient new exports is just as important and difficult in agriculture and services as in manufacturing. Models developed by Melitz (2003), with a fixed cost of entry into export markets, provide a basis for modeling the endogenous emergence of new products. Again this is an area for future data and CGE model development.

***Distortions in markets for services***

The potential gains from trade liberalization in services are rarely considered in CGE models, or at best are included only in rather rudimentary ways. This is because of a lack of good data on bilateral services trade, and methodological difficulties in modelling distortions in services markets. This is a serious omission, since there are indications that the costs of barriers to trade in services may be much larger than the barriers presented by conventional trade measures such as tariffs and subsidies (Dee, Hanslow and Pham 2003).

Konan and Maskus (2006) point out that the costs of services distortions are likely to be larger than those on merchandize trade because they typically involve restrictions not only on cross-border trade (Mode 1 of GATS), but also on supply by establishing enterprises in the country or by the movement of service suppliers (Modes 3 and 4 of GATS). Jensen, Rutherford and Tarr (2006) find that the benefits of reform in services trade, when allowing for productivity growth in trading a wider range of qualities of goods as the quality of business services rise (following Markusen, Rutherford and Tarr 2006), completely dominate as a source of benefits from likely reforms following Russia's accession to the WTO. These methodological developments have begun to find their way into global CGE models, as reflected in the BKS study cited in Table 1, but much scope remains to improve services trade data and the measurement and modelling representation of services market distortions.

CGE models typically ignore the dynamics of financial capital markets. Trade expands the demand for international financial services to transfer the required payments and often to provide temporary credit. Trade reform thereby 'thickens' international markets by raising not only the share of global goods production that passes through them which reduces the variation across time in prices for traded products) but also markets for international financial services to transfer the required payments and to provide temporary credit. Together these forces contribute to the long-term stability of financial markets. Openness also tends to reduce inflation. It can do so by increasing competition in domestic markets, which drives down prices and reduces political pressure on the central bank to inflate, and by providing more options for people to hold savings in foreign currencies, which reduces the ability of governments to inflate savings away (Rogoff 2003).

### *Productivity-enhancing impacts of reform*

Economists have long been convinced that participation in international trade provides a bonus through improvements in productivity. Most of the investigation of these gains has been empirical, based loosely on Arrow's (1962) concept of learning-by-doing. Major contributions to this literature include Feder (1983), Dollar (1992) and Sachs and Warner (1995), all of which find strong links between export performance and economic growth. Rodriguez and Rodrik (2001) raise concerns about the robustness of the estimated relationship between aggregate exports and productivity growth. During the same period, Clerides, Lach and Tybout (1998) questioned the learning-by-doing framework based on firm-level findings that exporting firms were more efficient before entering export markets, rather than because of learning-by-doing after entering these markets.

More recent research on the aggregate links between exports and productivity growth has more carefully examined the potential endogeneity of the relationship, and continues to find an aggregate relationship (Frankel and Romer 1999). A number of subsequent firm-level studies have re-examined the relationship between exporting and growth, and have found evidence of productivity growth associated with learning-by-doing after firms enter exporting. Blalock and Gertler (2005) find an increase in firm productivity of between 2 and 5 percent after Indonesian firms enter export markets. Fernandes and Isgut (2006) find evidence of an increase in productivity from learning-by-exporting when Colombian firms entered export markets. Van Biesebrock (2004) finds that African exporting firms had higher productivity before entering export markets, and that their productivity levels, and their subsequent rates of productivity growth, increased after entering export markets. Girma, Greenaway and Kneller (2004) also find both higher initial levels of productivity and higher productivity growth rates after entry into exporting.

To date the econometric literature on the growth benefits of trade liberalization provides little guidance on how long the dynamic effects from a one-off trade reform will last. This is yet another are requiring further empirical research.

### *Modeling labor market and migration responses to immigrations restrictions*

Labor markets are very crudely modelled in global CGE models, partly for simplicity but also because of the difficulties in compiling internationally comparable data on skill levels and occupations. This problem is compounded when one abandons the assumption of no international labor flows and seeks to model the effects of altering restrictions on immigration. The approach adopted in the World Bank (2006) study cited above is but a start to addressing this issue, and much scope remains for further work in this area. More empirical research is needed also on the costs associated with international migration to both the migrants and to (particularly host country) governments.

## Conclusion

The theory and available evidence surveyed above show that subsidies and trade barriers, including restrictions on the international movement of labor, are wasteful. Pre-announced, gradual reductions in them, especially if done multilaterally, would yield huge economic benefits and relatively little economic cost, and hence extremely

high benefit/cost ratios. Moreover, such reforms would contribute enormously to reducing global inequality and poverty. Furthermore, while some social and environmental effects may be perceived as negative, many more will be positive. Even where some of those effects are harmful, there are almost always cheaper ways of obtaining better social and environmental outcomes than via trade and subsidy measures. The reasons these inefficient measures persist is partly lack of understanding of the benefits being foregone, but mostly it is because a small number of vested interests lobby for their retention (although in the case of immigration restrictions there is also opposition from some long-time citizens in high-income countries who believe their country is already at or beyond the optimal degree of cultural diversity).

The challenge is to find politically feasible opportunities for ridding the world of subsidies and trade barriers and lowering immigration restrictions. This paper suggests the most obvious way is currently before us in the form of the Doha Development Agenda of multilateral trade negotiations under the World Trade Organization. Seizing that opportunity for reform could reduce government outlays by hundreds of millions of dollars, and make it less attractive to seek preferential trade agreements which are prone to making excluded countries worse off. A successful Doha outcome would also make it less pressing to lower immigration barriers insofar as trade in products is a substitute for international labor movements – although the estimated global gains and inequality-reducing consequences of more migration are so large as to make this worthwhile in addition (or at least as part of a Doha outcome under Mode IV of the services component). Cuts in subsidies and trade barriers also would provide a means for citizens to spend more on other pressing problems (because under freer trade the world's resources would be allocated more efficiently), thereby *indirectly* contributing to opportunities to alleviate other challenges facing the world; and they could also *directly* alleviate poverty and thereby reduce environmental degradation and address other challenges such as communicable diseases, conflicts and arms proliferation, education under-investment, and hunger and malnutrition. All that is needed is the political will to agree to and implement such reforms. If that is not found for concluding the global Doha round soon, and given that far lower net benefits will flow from sub-global preferential trade agreements (especially for citizens of left-out countries) and the potentially huge benefits from migration (especially for citizens of today's developing countries), it would not be surprising if demands for visas and work permits intensifies along with increased irregular immigration.

## Appendix: The global, economy-wide GTAP database and the GTAP and LINKAGE CGE models

To estimate the potential economy-wide effects of regional and multilateral trade liberalizations, by far the most common methodology since the 1980s has involved global computable general equilibrium (CGE) models and databases.[36] It is a daunting task to compile and periodically update all the necessary data for such a model so, under the direction of Professor Tom Hertel of Purdue University, a consortium was established more than a decade ago for this purpose. Known as GTAP (the Global Trade Analysis Project), it is currently providing Version 6 of its database publicly (with a pre-release of Version 7 now under review by consortium members). That database provides reconciled production, consumption and bilateral goods and services trade data plus subsidies and trade distortion estimates[37] (including developing country preferences) as of 2001 for more than 80 countries or country groups spanning the world, each divided into 57 sectors spanning the entire economy (see www.gtap.org). Earlier versions based on 1997 or 1995 data had less country and product disaggregation and did not include tariff preferences. This database is the foundation of most global CGE trade models in use today. Version 6 is described in detail in Dimaranan (2006).

In addition, the GTAP Center at Purdue University has developed its own family of applied general equilibrium models (Hertel 1997). The core GTAP model is a standard, multi-region CGE model that is currently being used by more than one thousand researchers in scores of countries on five continents. (The GTAP database builds on contributions from many of these individuals, as well as the national and international agencies in the GTAP Consortium.) Perfect competition and constant returns to scale are assumed for all sectors of each economy in the core comparative static version.

The GTAP model utilizes a sophisticated representation of consumer demands that allows for differences in both the price and income responsiveness of demand in different regions depending upon both the level of development of the region and the particular consumption patterns observed in that region. On the supply-side, differences in factor endowments within and between countries interact with different sectoral factor intensities to drive changes in the sectoral composition of output in response to structural or policy shocks. The GTAP production system distinguishes sectors by their intensities in five primary factors of production: agricultural land, other natural resources, unskilled labor time, skilled labor time, and physical capital. Thus in a region where physical capital is accumulating rapidly relative to other factors, for example, that region's relatively capital intensive sectors tend to expand at the expense of other sectors. In addition to differences in intermediate input intensities, import intensities are also permitted to vary across uses. Since much trade is in intermediate inputs, the distinction between sales to final consumers and sales to other firms can be important. Lowering the cost of imported goods to consumers is quite different from lowering the cost of intermediate inputs to domestic firms that may be competing with imports in the final product market. As well, products are differentiated by place of production. The linkage between the different prices of a product is typically quite strong, but will depend on the degree of substitutability in consumption. In addition to matching up more effectively with reality, this approach has the advantage of permitting bilateral trade to be tracked, as opposed to simply reporting total exports net of imports.

[36] On the need for adopting a general rather than partial equilibrium methodology, see Anderson (2002).

[37] Estimating the height of trade barriers is a non-trivial task in itself, even for merchandise (Evans 2003) but especially for services (Findlay and Warren 2001) and if technical barriers to trade are involved (Maskus and Wilson 2001).

The LINKAGE model has been developed for use by the World Bank's global economic projections team (van der Mensbrugghe 2005). It is a relatively straightforward CGE model but with some characteristics that distinguish it from standard comparative static models such as the GTAP model. A key difference is that it is recursive, so while it starts with 2001 as its base year it can be solved annually through to 2015. The dynamics are driven by exogenous population and labor supply growth, savings-driven capital accumulation, and labor-augmenting technological progress (as assumed for the World Bank's global economic prospects exercise, see World Bank 2004, 2005). In any given year, factor stocks are fixed. Producers minimize costs subject to constant returns to scale production technology, consumers maximize utility, and all markets – including for labor – are cleared with flexible prices. There are three types of production structures. Crop sectors reflect the substitution possibility between extensive and intensive farming. Livestock sectors reflect the substitution possibility between intensive versus pasture feeding. And all other sectors reflect standard capital/labor substitution (with two types of labor: skilled and unskilled). As in the GTAp model there is a single representative household per modeled region, allocating income to consumption using the extended linear expenditure system. Trade is modeled using a nested Armington structure for each product, in which aggregate import demand is the outcome of allocating domestic absorption between the domestically produced good and aggregate imports of that product, and then that aggregate import demand is allocated across source countries to determine the pattern of bilateral trade flows. Government fiscal balances are fixed in any given year, with the fiscal objective being met by changing the level of lump sum taxes on households. This implies that losses of tariff revenues are replaced frictionlessly by higher direct taxes on households. The current account balance also is fixed. For example, if import tariffs are reduced, the propensity to import increases and additional imports are financed by increasing export revenues. The latter typically is achieved by a real exchange rate depreciation. Finally, investment is driven by savings. With fixed public and foreign saving, investment comes from changes in the savings behavior of the domestic household and from changes in the unit cost of investment. The latter can play an important role in a dynamic model if imported capital goods are taxed. Because the capital account is exogenous, rates of return across countries can differ over time and across simulations. The model only solves for relative prices, with the numéraire, or price anchor, being the export price index of manufactured exports from high-income countries. This price is fixed at unity in the base year and throughout the projection period to 2015.

## References


Abella, M. (2004), 'The Role of Recruiters in Labor Migration', in D.S. Massey and J.E. Taylor (eds.), *International Migration: Prospects and Policies in a Global Market,* Oxford : Oxford University Press.

Acharya, R.C. and W. Keller (2007), 'Technology Transfers Through Imports', NBER Working Paper 13086, Cambridge MA, May.

Ades, A. and R. di Tella (1999), 'Rents, Competition, and Corruption,' *American Economic Review* 89 (4): 982-93, September.

Aghion, P. and R. Griffith (2005), *Competition and Growth: Reconciling Theory and Evidence,* Cambridge MA: MIT Press.

Aghion, P. and P. Howitt (2006), 'Appropriate Growth Policy: A Unified Framework', *Journal of the European Economic Association* 4: 269-314.

Anderson, J. (2006), 'Consistent Policy Aggregation', mimeo, Boston College, Boston MA.

Anderson, J. and J.P Neary (1992), 'Trade Reform with Quotas, Partial Rent Retention, and Tariffs', *Econometrica* 60(1): 57-76.

Anderson, K. (1992), 'Effects on the Environment and Welfare of Liberalising World Trade: The Cases of Coal and Food,' Ch. 8 in *The Greening of World Trade Issues,* edited by K. Anderson and R. Blackhurst, London: Harvester-Wheatsheaf and Ann Arbor: University of Michigan.

Anderson, K. (2002), 'Economy-wide Dimensions of Trade Policy Reform,' Ch. 2 in *Development, Trade and the WTO: A Handbook,* edited by B. Hoekman, A. Matoo and P. English, Washington, D.C.: The World Bank.

Anderson, K. (2003), 'Measuring Effects of Trade Policy Distortions: How Far Have We Come?' *The World Economy* 26(4): 413-40, April.

Anderson, K. (2006), 'Reducing Distortions to Agricultural Incentives: Progress, Pitfalls and Prospects', *American Journal of Agricultural Economics* 88(5): 1135-46, December.

Anderson, K., B. Dimaranan, T. Hertel and W. Martin (1997), 'Economic Growth and Policy Reforms in the APEC Region: Trade and Welfare Implications by 2005', *Asia-Pacific Economic Review* 3(1): 1-18, April.

Anderson, K. and Y. Hayami (1986), *The Political Economy of Agricultural Protection East Asia in International Perspective,* London: Allen and Unwin.

Anderson, K. and L.A. Jackson (2005), 'Some Implications of GM Food Technology Policies for Sub-Saharan Africa', *Journal of African Economies* 14(3): 385-410, September.

Anderson, K., L.A. Jackson and C.P. Nielsen (2004), 'GM Rice Adoption: Implications for Welfare and Poverty Alleviation', *Journal of Economic Integration* 20(4): 771-88, December.

Anderson, K., W. Martin and D. van der Mensbrugghe (2006a), 'Market and Welfare Implications of the Doha Reform Scenarios', Ch. 12 in *Agricultural Trade Reform and the Doha Development Agenda,* edited by K. Anderson and W. Martin, London: Palgrave Macmillan (co-published with the World Bank).

Anderson, K., W. Martin and D. van der Mensbrugghe (2006b), 'Doha Merchandise Trade Reform: What's at Stake for Developing Countries?' *World Bank Economic Review* 20(2): 169-95, July.

Anderson, K., W. Martin and D. van der Mensbrugghe (2006c), 'Would Multilateral Trade Reform Benefit Sub-Saharan Africa?' *Journal of African Economies* 15(4): 626-70, December.
Anderson, K., W. Martin and E. Valenzuela (2006), 'The Relative Importance of Global Agricultural Subsidies and Market Access', *World Trade Review* 5(3): 357-76, November.
Anderson, K. and W. McKibbin (2000), 'Reducing Coal Subsidies and Trade Barriers: Their Contribution to Greenhouse Gas Abatement,' *Environment and Development Economics* 5(4): 457-81, October.
Anderson, K. and E. Valenzuela (2007), 'The World Trade Organization's Doha Cotton Initiative: A Tale of Two Issues', *The World Economy* 30(8): 1281-1304, August.
Armington, P. (1969), 'A Theory of Demand for Products Distinguished by Place of Production', *IMF Staff Papers* 16(1): 159-78, March.
Arnold, M., B. Javorcik and A. Mattoo (2006), 'The Productivity Effects of Services Liberalization: Evidence from the Czech Republic', mimeo, World Bank.
Arrow, K. (1962) 'The Economic Implications of Learning by Doing', *Review of Economic Studies* 29(3):155-173. June.
Bacchetta, M. and M. Jansen (2003), 'Adjusting to Trade Liberalization: The Role of Policy, Institutions and WTO Disciplines,' Special Studies 7, Geneva: World Trade Organization, April.
Bach, C. and W. Martin (2001), 'Would the Right Tariff Aggregator for Policy Analysis Please Stand Up?' *Journal of Policy Modeling* 23: 621-35.
Baldwin, R.E. (2004), 'Openness and Growth: What's the Empirical Relationship?' in *Challenges to Globalization: Analysing the Economics*, edited by R.E. Baldwin and L.A. Winters, Chicago: University of Chicago Press for NBER and CEPR.
Baldwin, R.E., J. Mutti and J.D. Richardson (1980), 'Welfare Effects on the United States of a Significant Multilateral Trade Reduction', *Journal of International Economics* 6: 405-23.
Beghin, J., D. van der Mensbrugghe and D. Roland-Holst (2002), *Trade and the Environment in General Equilibrium: Evidence from Developing Economies*, Norwell MA: Kluwer Academic Publishers.
Bendivogli, C. and P. Pagano (1999), 'Trade, Job Destruction and Job Creation in European Manufacturing', *Open Economies Review* 10: 156-84.
Bermudez, E. (2004), *Sustainability Assessments of Trade Policies and Programmes*, Gland: WWF International, January.
Bernard, A.B., J.B. Jensen, S.J. Redding and P.K. Schott (2007), 'Firms in International Trade', NBER Working Paper 13054, Cambridge MA, April.
Bhagwati, J.N. (1971), 'The Generalized Theory of Distortions and Welfare', in *Trade, Balance of Payments and Growth*, edited by J.N. Bhagwati et al., Amsterdam: North-Holland.
Billmeier, A. and T. Nannicini (2007), 'Trade Openness and Growth: Pursuing Empirical Glasnost', IMF Working Paper 07/156, Washington DC, July.
Blalock, G. and P. Gertler (2004), 'Learning from Exporting Revisited in a Less Developed Setting', *Journal of Development Economics* 75: 397–416.
Borjas, G.J. (1994), 'The Economics of Immigration', *Journal of Economics Literature* 32(4): 1167-77.

Bouët, A., Y. Decreux L. Fontagné, S. Jean and D. Laborde (2004), 'A consistent, *ad valorem* equivalent measure of applied protection across the world: the MAcMaps-HS6 database', CEPII Working Paper 2004-22, CEPII, Paris.

Broda, C.M. and D.E. Weinstein (2006), 'Globalization and the Gains from Variety', *Quarterly Journal of Economics*, 121(2): 541-85.

Brown, D.K., K. Kiyota and R.M. Stern (2005), 'Computational Analysis of the Free Trade Area of the Americas (FTAA)', *North American Journal of Economics and Finance* 16: 153-85.

Cameron, H. (2007), 'The Evolution of the Trade and Environment Debate at the WTO', Ch. 1 in A. Najam, M. Halle and R. Melendez-Ortiz (eds), *Trade and Environment: A Resource Book*, Geneva: International Centre for Trade and Sustainable Development (ICTSD), see www.trade-environment.org

CEPII (2003), *Methodological Tools for SIA: Report of the CEPII workshop held on 7-8 November 2002 in Brussels*, Paris: CEPII Working Paper No. 2003-19. Download at http://www.cepii.fr/anglaisgraph/workpap/pdf/2003/wp03-19.pdf

Chang, R., L. Kaltani and N. Loayza (2005), 'Openness Can be Good for Growth: The Role of Policy Complementarity', Policy Research Working Paper 3763, World Bank, Washington DC, November.

Chua, A. (2003), *World on Fire: How Exporting Free Market Democracy Breeds Ethnic Hatred and Global Instability*, New York: Random House.

Clerides, S., Lach, S. and Tybout, J. (1998), 'Is Learning by Exporting Important? Micro-dynamic Evidence from Colombia, Mexico and Morocco', *Quarterly Journal of Economics* 113(3): 903-47.

Cline, W.R. (2004a), *Trade Policy and Global Poverty*, Washington DC: Center for Global Development.

Cline, W.R. (2004b), 'Climate Change', Ch. 1 in *Global Crises, Global Solutions***,** edited by B. Lomborg, Cambridge: Cambridge University Press.

Cline, W.R., T.O. Kawanabe, M. Kronsjo and T. Williams (1978), *Trade Negotiations in the Tokyo Round: A Quantitative Assessment*, Washington DC: Brookings Institution.

Coase, R. (1960), 'The Problem of Social Cost', *Journal of Law and Economics* 3:1-44.

Cole, M.A. (2003), 'Development, Trade, and the Environment: How Robust is the Environmental Kuznets Curve?' *Environment and Development Economics* 8(4): 557-80.

Collier, P. (2007), *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It*, London: Oxford University Press.

Copland, B. and M.S. Taylor (2003), *Trade and the Environment: Theory and Evidence*, Princeton NJ: Princeton University Press.

Corden, W.M. (1979), 'Tell us Where the New jobs Will Come From', *Bank of New South Wales Review* Vol. 30, October. Reprinted in *The World Economy* 8(2): 183-88, June 1985, and as Ch. 7 in the author's *The Road to Reform: Essays on Australian Economic Policy*, Melbourne: Addison-Wesley, 1997.

Corden, W.M. (1997), *Trade Policy and Economic Welfare* (second edition), Oxford: Clarendon Press.

de Feranti, D., G.E. Perry, D. Lederman and W. Maloney (2001), *From Natural Resources to the Knowledge Economy: Trade and Job Quality*, Latin American and Caribbean Studies, Washington DC: World Bank.

de Melo, J. and D. Tarr (1990), 'Welfare Costs of US Quotas on Textiles, Steel and Autos', *Review of Economics and Statistics* 72: 489-97.

Deardorff, A.V. and R.M. Stern (1979), *An Economic Analysis of the Effects of the Tokyo Round of Multilateral Trade Negotiations on the United States and Other Major Industrial Countries*, MTN Studies 5, Washington DC: U.S. Government Printing Office.
Deardorff, A.V. and R.M. Stern (1986), *The Michigan Model of World Production and Trade: Theory and Applications*, Cambridge MA: MIT Press.
Dee, P., Hanslow, K. and D.T. Pham (2003), 'Measuring the Cost of Barriers to Trade in Services', in T. Ito and A.O. Krueger (eds.), *Services Trade in the Asia-Pacific Region*, Chicago: University of Chicago Press for the NBER.
Demindova, S., H.L. Kee and K. Krishna (2006), 'Do Trade Policy Differences Induce Sorting? Theory and Evidence from Bangladeshi Apparel Exporters', NBER Working Paper 12725, Cambridge MA, December.
Diebold, W., Jr. (1952), *The End of the ITO*, International Finance Section, Essays in International Finance No. 16, Princeton NJ: Princeton University Press.
Dimaranan, B.V. (ed.) (2006), *Global Trade, Assistance, and Protection: The GTAP 6 Data Base*, Center for Global Trade Analysis, Purdue University, West Lafayette.
Dimaranan, B.V., T. Hertel and R. Keeney (2004), 'OECD Domestic Support and the Developing Countries,' in B. Kuha-Gasnobis (ed.), *The WTO, Developing Countries and the Doha Development Agenda*, New York: Palgrave Macmillan.
Dimaranan, B.V., E. Ianchovichina and W. Martin (2007), 'Competing uIT Giants: Who Wins? Who Loses? Ch. 3 in L.A. Winters and S. Yusef (eds.), *Dancing with Giants: China, India and the Global Economy*, Washington DC: World Bank.
Dollar, D. (1992), Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDCs, 1976–1985, *Economic Development and Cultural Change* 40(3): 523–44.
Dollar, D. and A. Kraay (2002), 'Growth is Good for the Poor', *Journal of Economic Growth* 7(3): 195-225, September.
Dolman, B. (2008), 'Migration, Trade and Investment', Staff Working Paper, Productivity Commission, Canberra, February.
Easterly, W. (2001), *The Elusive Quest for Growth*, Cambridge MA: MIT Press.
Evans, C. (2003), 'The Economic Significance of National Border Effects', *American Economic Review* 93(4): 1291-1312, September.
Evenett, S. and A. Venables (2002), 'Export Growth in Developing Countries: Market Entry and Bilateral Trade Flows' www.alexandria.unisg.ch/Publikationen/22177
Faini, R. (2004), 'Trade Liberalization in a Globalizing World', CEPR Discussion Paper No. 4665, London, October.
Faini, R., J. de Melo and K.F. Zimmermann, (1999), *Migration: The Controversies and the Evidence*, Cambridge: Cambridge University Press.
Feder, G. (1983), 'On Exports and Economic Growth', *Journal of Development Economics* 12: 59-73.
Feenstra, R.C. (2004), *Advanced International Trade: Theory and Evidence*, Princeton NJ: Princeton University Press.
Feenstra, R.C., J.R. Markusen and W. Zeile (1992), 'Accounting for Growth with New Inputs', *American Economic Review* 82(2): 415-21, May.
Fernandes, A. and A. Isgut (2006), Learning-by-Exporting Effects: Are They for Real? Mimeo, World Bank, Washington DC.

Findlay, C. and T. Warren (2001), *Impediments to Trade in Services: Measurement and Policy Implications*, London and New York: Routledge.
Francois, J.F. (2000), 'Assessing the Results of General Equilibrium Studies of Multilateral Trade Negotiations', Policy Issues in International Trade and Commodities Study Series No. 3, Geneva: UNCTAD.
Francois, J.F. (2003), 'Assessing the Impact of Trade Policy on Labour Markets and Production', pp. 61-88 in *Methodological Tools for SIA*, CEPII Working Paper No. 2003-19, Paris: CEPII.
Francois, J. and W. Martin (2004), 'Commercial Policy, Bindings and Market Access', *European Economic Review* 48: 665-79, June.
Francois, J.F. and W. Martin (2007), 'Great Expectations: Ex Ante Assessments of the Welfare Impacts of Trade Reforms', mimeo, Erasmus University, Rotterdam, January.
Francois, J.F. and K.A. Reinert (eds.) (1997), *Applied Methods for Trade Policy Analysis: A Handbook*, Cambridge and New York: Cambridge University Press.
Frankel, J.A. and E.A. Cavallo (2004), 'Does Openness to Trade Make Countries More Vulnerable to Sudden Stops, Or Less? Using Gravity to Establish Causality', NBER Working Paper 10957, Cambridge MA, December.
Frankel, J.A. and D. Romer (1999), 'Does Trade Cause Growth?' *American Economic Review* 89(3): 379-99, June.
Frazer G., and J van Biesebroeck (2007) 'Trade Growth Under the African Growth and Opportunity Act', NBER Working Paper No. 13222. July.
Freeman, R.B. (2004), 'Trade Wars: The Exaggerated Impact of Trade in Economic Debate', *The World Economy* 27(1): 1-23, January.
Freeman, R.B. (2007), 'People Flows in Globalization', NBER Working Paper 12315, Cambridge MA, June.
Friedman, T.L. (2007), *The World is Flat: The Globalized World in the Twenty-First Century*, London: Penguin.
Furusawa, T. and E.L.C. Lai (1999), 'Adjustment Costs and Gradual Trade Liberalization' *Journal of International Economics* 49: 333-61.
Gasiorek, M., and L. A. Winters (2004) 'What Role for the EPAs in the Caribbean?, *The World Economy* 27(9): 1335-62
Giles, C. (2007), 'Backlash in Rich Nations Against Globalization, *The Financial Times*, London, 22 July.
Girma, S., D. Greenaway and R. Kneller (2004), 'Does Exporting Increase Productivity? A Microeconometric Analysis of Matched Firms', *Review of International Economics* 12(5): 855–866.
Glenday, G. (2002), 'Trade Liberalization and Customs Revenue: Does Trade Liberalization Lead to Lower Customs Revenue? The Case of Kenya', *Journal of African Finance and Economic Development* 5(2): 89-125.
Greenaway, D. (1993), 'Liberalizing Foreign Trade Through Rose-Tinted Glasses', *Economic Journal* 103: 208-22.
Greenaway, D. and C. Milner (1993), 'The Fiscal Implication of Trade Policy Reform: Theory and Evidence', UNDP/World Bank Trade Expansion Program Occasional Paper 9, Washington, DC: World Bank.
Greenaway, D. and D.R. Nelson (eds.) (2002), *Globalization and Labour Markets*, (two volumes), London: Edward Elgar Publishers.
Grossman, G.M. and E. Helpman (1991), *Innovation and Growth in the Global Economy*, Cambridge, Mass.: MIT Press.

Grossman, G.M. and K. Rogoff (eds.) (1995), *Handbook of International Economics Volume III*, Amsterdam: North-Holland.
Grossman, G.M. and E. Rossi-Hansberg (2006), 'Trading Tasks: A Simple Theory of Offshoring', NBER Working Paper 12721, Cambridge MA, December.
Hamilton, B. and J. Whalley (1984), 'Efficiency and Distributional Implications of Global Restrictions on Labor Mobility', *Journal of Development Economics* 14: 61-75.
Hanson, G.H. (2006), 'Illegal Migration from Mexico to the United States', *Journal of Economic Literature* 44: 869-924.
Hanson, G.H., R.J. Mataloni and M.J. Slaughter (2005), 'Vertical Production Networks in Multinational Firms', *Review of Economics and Statistics* 87(4): 664-78.
Harbaugh, W.T., A. Levinson and D.M. Wilson (2002), 'Re-examining the Empirical Evidence for an Environmental Kuznets Curve,' *Review of Economics and Statistics* 84(3): 541-51, August.
Harrigan, J. and E.K. Choi (eds.) (2003), *Handbook of International Trade*, Oxford: Blackwell.
Harrison, G.W., T.F. Rutherford and D.G. Tarr (2002), 'Trade Policy Options for Chile: The importance of Market Access', *World Bank Economic Review* 16(1): 49-79.
Harrison, G.W., T.F. Rutherford, D.G. Tarr and A. Gurgel (2004), 'Trade Policy and Poverty Reduction in Brazil', *World Bank Economic Review* 18(3): 289-317.
Helpman, E. and O. Itskhoki (2007), 'Labor Market Rigidities, Trade and Unemployment', NBER Working Paper 13365, Cambridge MA, October.
Helpman, E., D. Marin and T. Verdier (eds.) (2008), *The Organization of Firms in a Global Economy*, Cambridge MA: Harvard University Press (forthcoming).
Hertel, T.W. (ed.) (1997), *Global Trade Analysis: Modeling and Applications*, Cambridge and New York: Cambridge University Press.
Hertel, T.W. and L.A. Winters (eds.) (2006), *Poverty and the WTO: Impacts of the Doha Development Agenda*. New York: Palgrave Macmillan and World Bank.
Hertel, T.W., R. Keeney, M. Ivanic and L.A. Winters (2007), 'Distributional Effects of WTO Agricultural Reforms in Rich and Poor Countries', *Economic Policy*, 289-337, April.
Hoekman, B. (2006), 'Trade in Services, Economic Growth and Development, and International Cooperation: A Survey of the Literature', mimeo, World Bank, May.
Hoekman, B., F. Ng and M. Olarreaga (2002), 'Eliminating Excess Tariffs on Exports of Least Developed Countries', *World Bank Economic Review* 16: 1-21, January.
Hoekman, B., F. Ng and M. Olarreaga (2004), 'Agricultural Tariffs versus Subsidies: What's More Important for Developing Countries?' *World Bank Economic Review* 18(2): 175-204.
Hollander, J. (2003), *The Real Environmental Crisis: Why Poverty, Not Affluence, is the Environment's Number One Enemy*, Berkeley: University of California Press.
Hummels, D. and P. Klenow (2005), 'The Variety and Quality of a Nation's Exports', *American Economic Review* 95(3): 704-23.
Ianchovichina, E., A. Mattoo and M. Olarreaga (2001), 'Unrestricted Market Access for Sub-Saharan Africa: How Much is it Worth and Who Pays? *Journal of African Economies* 10: 410-32.
Irwin, D.A. (2002), *Free Trade Under Fire*, Princeton: Princeton University Press.

Jacobson, L.S., R.J. LaLonde and D.G. Sullivan (1993), 'Earnings Losses of Displaced Workers', *American Economic Review* 83(4): 685-709, September.
Javocik, B., W. Keller and J. Tybout (2006), 'Openness and Industrial responses in a Walmart World', NBER Working Paper 12457, Cambridge MA, August.
Jensen, J., T. Rutherford and D. Tarr (2006), 'The Impact of Liberalizing Barriers to Foreign Direct Investment in Services: The Case of Russian Accession to the World Trade Organization', *Review of Development Economics* 10
Just, R.E., D.L. Hueth and A. Schmitz (2004), *The Welfare Economics of Public Policy*, London: Edward Elgar.
Kanbur, R. (2001), 'Economic Policy, Distribution, and Poverty: The Nature of Disagreements', *World Development* 29(6): 1083-94.
Karp, L. and T. Paul (2005), 'Intersectoral Adjustments and Policy Interventions: The Importance of General Equilibrium Effects', *Review of International Economics* 13(2): 330-55, May.
Kindleberger, C.P. (1989), 'Commercial Policy Between the Wars', in Peter Mathias and Sidney Pollard (eds.), *The Cambridge Economic History of Europe, Vol. 8*. Cambridge: Cambridge University Press.
King, D.K. (2003), *GM Science Review: First Report*, Prepared by the GM Science Review Panel under the chairmanship of Sir David King for the UK Government, July.
Konan, D. and K. Maskus (2006), 'Quantifying the Impact of Services Liberalization in a Developing Country', *Journal of Development Economics* 81(1): 142-62.
Krueger, A.B. and J. Maleckova (2003), 'Education, Poverty, Political Violence and Terrorism: Is There a Causal Connection?' *The Journal of Economic Perspectives* 17(4): 119-144.
Krueger, A.O. (1983), *Trade and Employment in Developing Countries, Volume 3: Synthesis and Conclusions*, Chicago: University of Chicago Press for NBER.
Krueger, A.O. (1999), 'Free Trade Agreements as Protectionist Devices: Rules of Origin', pp. 91-102 in *Trade Theory and Econometrics: Essays in Honour of John S. Chipman*, edited by J. Melvin, J. Moore and R. Riezman, London: Routledge.
Krugman, P. (1980), 'Scale Economies, Product Differentiation, and the Pattern of Trade', *American Economic Review* 70(5): 950-59.
Lee, J.-W. (1995), 'Capital Goods Imports and Long-Run Growth', *Journal of Development Economics* 48: 91-110, October.
Lileeva, A. and D. Trefler (2007), 'Improved Access to Foreign Markets Raises Plant-Level Productivity ... For Some Plants', NBER Working Paper No. W13297, Cambridge MA, September.
Lindert, P. (1991), 'Historical Patterns of Agricultural Protection', in P. Timmer (ed.), *Agriculture and the State*, Ithaca NY: Cornell University Press.
Lloyd, P.J. (1974), 'A More General Theory of Price Distortions in an Open Economy', *Journal of International Economics* 4(4): 365-86, November.
Lomborg, B. (2001), *The Skeptical Environmentalist: Measuring the Real State of the World*, Cambridge and New York: Cambridge University Press.
Lumenga-Neso, O., M. Olarreaga and M. Schiff (2005), 'On 'Indirect' Trade-Related R&D Spillovers', *European Economic Review* 49(7): 1785-98, October.
Magee, S.P. (1972), 'The Welfare Effects of Restrictions on US Trade', *Brookings Papers on Economic Activity* 3: 645-701.

Manole, V. and W. Martin (2005), Keeping the Devil in the Details: A Feasible Approach to Aggregating Trade Distortions', Paper presented to the European Trade Study Group meetings, Dublin, September.
Markusen, J.R. (1983), 'Factor Movements and Commodity Trade as Complements', *Journal of International Economics* 13: 341-56.
Markusen, J., T. Rutherford and D. Tarr (2006), 'Foreign Direct Investment in Service and the Domestic market for Expertise', *Canadian Journal of Economics*, forthcoming.
Marques, G. and C. Pages (1998), 'Trade and Employment : Evidence from Latin America and the Caribbean', IDB Working Paper No. 366, Inter-American Development Bank, Washington DC, January.
Martin, P. (2004), 'Migration', Ch. 8 in *Global Crises, Global Solutions***,** edited by B. Lomborg, Cambridge: Cambridge University Press.
Martin, W. and Anderson, K. (2006). The Doha Agenda Negotiations on Agriculture: What Could They Deliver? *American Journal of Agricultural Economics* 88(5): 1211-18, December.
Maskus, K. and J. Wilson (eds.) (2001), *Quantifying the Impact of Technical Barriers to Trade: Can it be Done?* Ann Arbor: University of Michigan Press.
Mattoo, A. and A. Subramanian (2003), 'What Would a Development-Friendly WTO Architecture Really Look Like?' IMF Working Paper WP/03/153, Washington DC, August.
Mattoo, A. and A. Carzaniga (eds.) (2002), *Moving People to Deliver Services: Labour Mobility and the WTO*, London: Oxford University Press.
Matusz, S. and D. Tarr (2000), 'Adjusting to Trade Policy Reform', in *Economic Policy Reform: The Second Stage*, edited by A.O. Krueger, Chicago: University of Chicago Press.
Mazumdar, J. (2001), 'Imported Machinery and Growth in LDCs', *Journal of Development Economics* 65: 209-224, June.
McCulloch, N., L.A. Winters and X. Cirera (2001), *Trade Liberalization and Poverty: A Handbook*, London: Centre for Economic Policy Research.
Melitz, M. (2003), 'The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity', *Econometrica* 71(6): 1692-1725.
Michaely, M. (2003), 'Goods versus Factors: When Borders Open, Who Moves?' *The World Economy* 26(4): 533-54, April.
Michaely, M., D. Papageorgiou and A. Choksi (eds.) (1991), *Liberalizing Foreign Trade, 7: Lessons of Experience in the Developing World*, Cambridge MA and Oxford: Basil Blackwell.
Milner, C., O. Morrissey and A. McKay (2005), 'Somee Simple Analytics of the Trade and Welfare Effects of Economic Partnership Agreements', *Journal of the African Economies* 14(3): 327-58.
Moreira, M. and S. Najberg (2000), 'Trade Liberalization in Brazil: Creating of Exporting Jobs?', *Journal of Development Studies* 36(3): 78-99, February.
Moses, J.W. and B. Letnes (2004), 'The Economic Costs to International Labor Restrictions: Revisiting the Empirical Discussion', *World Development* 32(10): 1609-26.
Mundell, R.A. (1957), 'International Trade and Factor Mobility', *American Economic Review* 47: 321-35.
Nash, J. and W. Takacs (1998), 'Lessons from the Trade Expansion Program', Ch. 1 in *Trade Policy Reform: Lessons and Implications*, edited by J. Nash and W. Takacs, Washington DC: World Bank.

OECD (1996), *Subsidies and the Environment: Exploring the Linkages*, Paris: OECD.
OECD (1997), *Reforming Energy and Transport Subsidies: Environmental and Economic Implications*, Paris: OECD.
OECD (1998), *Improving the Environment Through Reducing Subsidies*, Paris: OECD.
OECD (2003a), *Agricultural Trade and Poverty: Making Policy Analysis Count*, Paris: OECD.
OECD (2003b), *Environmentally Harmful Subsidies: Policy Issues and Challenges*, Paris: OECD.
OECD (2006), *Agricultural Policy and Trade Reform: Potential Effects at Global, National and Household Levels*, Organization for Economic Cooperation and Development, Paris.
Olsen, M. (1965), *The Logic of Collective Action*, Cambridge MA: Harvard University Press.
Oneal, J. and B. Russett (2000), *Triangulating Peace: Democracy, Interdependence and International Organizations*, New York: Norton.
Panagariya, A. (2004), 'Subsidies and Trade Barriers: Alternative Perspective 10.2', pp.592-601 in *Global Crises, Global Solutions*, edited by B. Lomborg, Cambridge and New York: Cambridge University Press.
Parsons, C.R., R. Skeldon, T.L. Walmsley and L.A. Winters (2007), 'Quantifying International Migration: a Database of Bilateral Migrant Stocks', World Bank Policy Research Working Paper 4165, Washington DC, March.
Prasad, E., K. Rogoff, S. Wei and A. Khose (2006), 'Effects of Financial Globalization on developing Countries', IMF Occasional Paper 220, Washington DC.
Pritchard, L. (2007), *Let Their People Come: Breaking the Gridlock on Global Labor Mobility*, Washington DC: Center for Global Development.
Ravallion, M. (2006), 'Looking Beyond Averages in the Trade and Policy Debate', *World Development* 34(8): 1374-92, August.
Rivera-Batiz, L. and P. Romer (1991), 'International Integration and Endogenous Growth', *Quarterly Journal of Economics* 106: 531-56.
Rodrigeuz, F. and D. Rodrik (2001), 'Trade Policy and Economic Growth: A Skeptic's Guide to Cross-National Evidence', in B.S. Bernanke and K. Rogoff (eds.), *NBER Macroeconomics Annual 2000*, Cambridge MA: MIT Press.
Rodrik, D. (2003), 'Growth Strategies', NBER Working Paper 10050, Cambridge MA, October.
Rodrik, D. (2004), 'Industrial Policy for the Twenty-first Century', mimeo, Harvard University, Cambridge MA.
http://ksghome.harvard.edu/~drodrik/UNIDOSep.pdf
Rogoff, K.S. (2003), 'Disinflation: An Unsung Benefit of Globalization,' *Finance and Development* 40(4): 54-55, December.
Romalis, J. (2007), 'Market Access, Openness and Growth', NBER Working Paper 13048, Cambridge MA, July.
Romer, P. (1994), 'New Goods, Old Theory, and the Welfare Costs of Trade Restrictions,' *Journal of Development Economics* 43(1): 5-38,
Rutherford, T.F. and D.G. Tarr (2002). 'Trade Liberalization, Product Variety and Growth in a Small Open Economy: A Quantitative Assessment', *Journal of International Economics* 56**(**2**):** 247-72.
Sachs, J.D. and A. Warner (1995), 'Economic Reform and the Process of Global Integration', *Brookings Papers on Economic Activity* 1: 1-95.

Sala-i-Martin, X. (2006), 'The World Distribution of Income: Falling Poverty and … Convergence, Period', *Quarterly Journal of Economics* 121(2): 351-397.
Schiff, M. (2007), 'Optimal Immigration Policy: Permanent, Guest-Worker, or Mode IV?' mimeo, World Bank, Washington DC, June.
Sen, A. (1999), *Development as Freedom*, New York: Anchor Books.
Tangermann, S. (2005), 'OECD Area Agricultural Policies and the Interests of Developing Countries', *American Journal of Agricultural Economics* 87(5): 1128-44, December.
Taylor, M.S. (1999), 'Trade and Trade Policy in Endogenous Growth Models', Ch. 15 in *International Trade Policy and the Pacific Rim*, edited by J. Piggott and A. Woodland, London: Macmillan for the IAE.
Townsend, R.M. and K. Ueda (2007), 'Welfare Gains from Financial Globalization', IMF Working Paper 07/154, Washington DC, July.
Trefler, D. (2004), 'The Long and Short of the Canada-US Free Trade Agreement', *American Economic Review* 94(4): 870-895, September.
Tyers, R. and Anderson, K. (1992), *Disarray in World Food Markets: a Quantitative Assessment*. Cambridge and New York: Cambridge University Press.
UN Population Division (2002), *International Migration Report 2002*, New York: United Nations.
UNECA (2007) *The Economic and Welfare Impacts of EU-Africa Economic partnership Agreements*, ATPC, Briefing Note No. 6, UNECA, Addis Ababa.
UNCTAD/Commonwealth Secretariat (2001), *Duty and Quota Free Market Access for LDCs: An Analysis of Quad Initiatives*, Geneva: UNCTAD and London: Commonwealth Secretariat.
USDA (2001), *Agricultural Policy Reform in the WTO: The Road Ahead*, Economic Research Service, Agricultural Economic Report 802, US Department of Agriculture, Washington DC.
USITC (1997), *The Dynamic Effects of Trade Liberalization: An Empirical Analysis*, Publication 3069, US International Trade Commission, Washington, DC, Oct.
Vamvakidis, A. (1999), 'Regional Trade Agreements or Broad Liberalization: Which Path Leads to Faster Growth?', *IMF Staff Papers* 46(1): 42-69.
van Beers, C. and A. de Moor (2001), *Public Subsidies and Policy Failures: How Subsidies Distort the Natural Environment, Equity and Trade and How to Reform Them*, Cheltenham: Edward Elgar.
van Biesebrock, J. (2005), 'Exporting Raises Productivity in Sub-Saharan African Manufacturing Firms', *Journal of International Economics* 67: 373-91.
van der Mensbrugghe, D. (2005), 'LINKAGE Technical Reference Document: Version 6.0', *mimeo*, World Bank, Washington DC, January and at www.worldbank.org/prospects/linkagemodel
van der Mensbrugghe, D. (2006), 'Estimating the Benefits: Why Numbers Change', Ch. 4 in *Trade, Doha and Development: A Window into the Issues*, edited by R. Newfarmer, Washington DC: World Bank.
Ventura, J. (2005), 'A Global View of Economic Growth', in P. Aghion and S Durlauf (eds.), *Handbook of Economic Growth*, Amsterdam: Elsevier.
von Moltke, A., C. McKee and T. Morgan (2004), *Energy Subsidies: Lessons Learned in Assessing Their Impact and Designing Policy Reforms*, London: Greenleaf Books for UNEP.
Wacziarg, R. (2001), 'Measuring the Dynamic Gains From Trade' *World Bank Economic Review* 15(3): 393-429, October.

Wacziarg, R. and K.H. Welch (2003), 'Trade Liberalization and Growth: New Evidence', NBER Working Paper 10152, Cambridge MA, December.
Whalley, J. (1985), *Trade Liberalization Among Major World Trading Areas*, Cambridge MA: MIT Press.
Whalley, J. (2000), 'What Can the Developing Countries Infer from the Uruguay Round Models for Future Negotiations?' Policy Issues in International Trade and Commodities Study Series No. 4, Geneva: UNCTAD.
Whalley, J. (2004), 'Assessing the Benefits to Developing Countries of Liberalization in Services Trade', *The World Economy* 27(8): 1223-53, August.
Whalley, J. (2006), 'China's FDI and Non-FDI Economies and the Sustainability of Future High Chinese Growth', NBER Working Paper No. 12249, Cambridge MA, May.
Williamson, J.G. (2002), 'Winners and Losers Over Two Centuries of Globalization', WIDER Annual Lecture 6, United Nations University, Helsinki. Reprinted in pp.136-74 of *Wider Perspectives on Global Development*, London: Palgrave Macmillan, 2006.
Winters, L.A. (2002), 'Trade Liberalisation and Poverty: What Are the Links?' *The World Economy* 25(9): 1339-68, September.
Winters, L.A. (2004), 'Trade Liberalization and Economic Performance: An Overview', *Economic Journal* 114: F4-F21, February.
Winters, L.A., N. McCulloch and A., McKay (2004), 'Trade Liberalization and Poverty: The Empirical Evidence', *Journal of Economic Literature* 62(1): 72-115, March.
Winters, L.A. and W.E. Takacs (1991), 'Labour Adjustment Costs and British Footwear Protection', *Oxford Economic Papers* 43: 479-501.
Winters, L.A., T. Walmsley, Z.K. Wang and R. Grynberg (2003), 'Liberalizing Temporary Movement of Natural Persons: An Agenda for the Development Round', *The World Economy* 26(8): 1137-61, August.
World Bank (2002), *Global Economic Prospects 2002: Making Trade World for the World's Poor*, Washington DC: The World Bank.
World Bank (2004), *Global Economic Prospects 2004: Realizing the Development Promise of the Doha Agenda*, Washington DC: The World Bank.
World Bank (2005), *Global Economic Prospects 2005: Trade, Regionalism, and Development*, Washington DC: The World Bank.
World Bank (2006), *Global Economic Prospects 2006: Economic Implications of Remittances and Migration*, Washington DC: The World Bank.

Table 1: Comparative static estimates of economic welfare gains from full global liberalization of goods and services trade

| **Study** | **Market assumptions**[a] | **Sectors liberalized** | **Baseline year** (of EV welfare measure) | **Welfare gain, non-OECD** (US$ billions) | **Welfare gain, global** (US$ billions)[b] | Year of currency (US dollars)[b] |
|---|---|---|---|---|---|---|
| AMV (2006) | CRS/PC | Goods only | 2015 | 142 | **287** | 2001 |
| BKS (2005) | IRS/MC | Goods, services and FDI | 1997 | na | **2417**<br>**{2616}** | 1997<br>{2001} |
| HRT (2002) | CRS/PC | Goods only | 1995 | 100<br>{113} | **456**<br>**{514}** | 1995<br>{2001} |
| WBGEP (2002) | CRS/PC plus productivity boost | Goods only | 2015 | 539<br>{583} | **832**<br>**{901}** | 1997<br>{2001} |

[a] Constant returns to scale/perfect competition and increasing returns to scale/monopolistic competition/firm-level differentiated products.

[b] In cases where the year of currency is pre-2001, welfare values shown below the reported numbers, in {}, have been inflated to 2001 assuming 2 percent inflation per year (the change in the United States' GDP Deflator).

Sources: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.4); Brown, Kiyota and Stern (2005, Table 4); Harrison, Rutherford and Tarr (2002, Table 5); and World Bank (2002, Table 6.1).

Table 2: Import-weighted average applied tariffs, by sector and country, 2005 (percent)

| Importing region: | Agriculture and processed food | *(Primary agriculture only)* | *(Processed food only)* | Textiles and clothing | Other manufac-turing |
|---|---|---|---|---|---|
| **World** | **15.2** | | | **9.3** | **3.1** |
| **High-income** | **15.9** | | | **7.3** | **1.2** |
| Australia & NZ | 2.6 | 0.3 | 3.3 | 13.9 | 4.1 |
| EU25 + EFTA | 13.9 | 13.2 | 14.7 | 5.1 | 1.7 |
| United States | 2.4 | 2.3 | 2.5 | 9.6 | 0.9 |
| Canada | 9.0 | 1.2 | 14.1 | 8.7 | 0.5 |
| Japan | 29.3 | 48.0 | 20.8 | 9.0 | 0.4 |
| S. Korea & Taiwan | 53.0 | 84.5 | 22.4 | 9.2 | 3.6 |
| Hong Kong & Sing. | 0.1 | 0.0 | 0.2 | 0.0 | 0.0 |
| **Developing countries**[b] | **14.2** | | | **14.3** | **7.1** |
| ***Middle-income*** | ***12.1*** | | | ***13.6*** | ***6.0*** |
| Argentina | 7.1 | 5.6 | 7.8 | 11.1 | 10.1 |
| Brazil | 5.0 | 2.4 | 9.0 | 14.7 | 9.7 |
| China | 10.3 | 9.9 | 11.0 | 9.6 | 5.5 |
| Mexico | 10.3 | 10.8 | 9.7 | 7.8 | 4.3 |
| Russia | 13.5 | 14.6 | 12.8 | 15.8 | 7.8 |
| South Africa | 8.6 | 5.9 | 10.6 | 21.9 | 5.4 |
| Thailand | 16.7 | 12.7 | 19.2 | 16.4 | 7.6 |
| Turkey | 16.6 | 16.4 | 17.0 | 3.8 | 1.2 |
| Rest of East Asia | 13.4 | 18.6 | 9.0 | 8.7 | 3.5 |
| Rest of LAC | 10.8 | 9.2 | 11.8 | 12.9 | 8.4 |
| Rest of ECA | 15.7 | 10.4 | 19.5 | 9.3 | 3.2 |
| M. East &N. Africa | 13.1 | 8.2 | 18.3 | 23.9 | 7.2 |
| ***Low-income*** | ***22.0*** | | | ***17.9*** | ***14.1*** |
| Bangladesh | 12.7 | 7.4 | 21.2 | 29.9 | 16.2 |
| India | 49.9 | 25.7 | 75.6 | 26.5 | 24.2 |
| Indonesia | 5.0 | 4.3 | 6.2 | 8.0 | 4.3 |
| Vietnam | 37.1 | 13.1 | 44.8 | 29.1 | 12.3 |
| Rest of South Asia | 21.1 | 14.2 | 32.0 | 6.6 | 14.3 |
| Selected SSAfrica[a] | 11.8 | 10.2 | 13.0 | 12.5 | 7.5 |
| Rest of SSAfrica | 21.2 | 18.0 | 23.6 | 26.2 | 14.0 |
| Rest of the World | 11.8 | 1.9 | 18.7 | 5.6 | 8.9 |

[a] The Selected Sub-Saharan African countries (for which national modules are available in the LINKAGE Model) include Botswana, Madagascar, Malawi, Mozambique, Tanzania, Uganda, Zambia, Zimbabwe.

[b] Numbers in parentheses are the averages at the start of 2005 following WTO accession by China and end of MFA.

*Source:* Projections from the GTAP database Version 6.05 using the World Bank's LINKAGE model, by Anderson, Martin and van der Mensbrugghe (2006a, Table 12.3).

Table 3: Impacts on real income from full liberalization of global merchandise trade, by country/region, 2015

(relative to the baseline, in 2001 dollars and percent)

| | **Total real income gain p.a.** ($billion) | *Change in income due just to change in terms of trade* ($billion) | *Gain due to improved efficiency of resource use net of terms of trade effect* ($billion) | ***Total real gain as percentage of baseline income in 2015[a]*** |
|---|---|---|---|---|
| Australia and New Zealand | 6.1 | 3.5 | 2.6 | 1.0 (0.4) |
| EU 25 plus EFTA | 65.2 | 0.5 | 64.7 | 0.6 (0.6) |
| United States | 16.2 | 10.7 | 6.5 | 0.1 (0.0) |
| Canada | 3.8 | -0.3 | 4.1 | 0.4 (0.4) |
| Japan | 54.6 | 7.5 | 47.1 | 1.1 (1.0) |
| Korea and Taiwan | 44.6 | 0.4 | 44.2 | 3.5 (3.5) |
| Hong Kong and Singapore | 11.2 | 7.9 | 3.3 | 2.6 (0.8) |
| Argentina | 4.9 | 1.2 | 3.7 | 1.2 (0.9) |
| Bangladesh | 0.1 | -1.1 | 1.2 | 0.2 (2.4) |
| Brazil | 9.9 | 4.6 | 5.3 | 1.5 (0.8) |
| China | 5.6 | -8.3 | 13.9 | 0.2 (0.5) |
| India | 3.4 | -9.4 | 12.8 | 0.4 (1.5) |
| Indonesia | 1.9 | 0.2 | 1.7 | 0.7 (0.7) |
| Thailand | 7.7 | 0.7 | 7.0 | 3.8 (3.4) |
| Vietnam | 3.0 | -0.2 | 3.2 | 5.2 (5.5) |
| Russia | 2.7 | -2.7 | 5.4 | 0.6 (1.2) |
| Mexico | 3.6 | -3.6 | 7.2 | 0.4 (0.8) |
| South Africa | 1.3 | 0.0 | 1.3 | 0.9 (0.9) |
| Turkey | 3.3 | 0.2 | 3.1 | 1.3 (1.2) |
| Rest of South Asia | 1.0 | -0.8 | 1.8 | 0.5 (0.9) |
| Rest of East Asia | 5.3 | -0.9 | 6.2 | 1.9 (2.2) |
| Rest of LAC | 10.3 | 0.0 | 10.3 | 1.2 (1.2) |
| Rest of ECA | 1.0 | -1.6 | 2.6 | 0.3 (0.8) |
| Middle East and North Africa | 14.0 | -6.4 | 20.4 | 1.2 (1.7) |
| Selected SSA countries[b] | 1.0 | 0.5 | 0.5 | 1.5 (0.8) |
| Rest of Sub-Saharan Africa | 2.5 | -2.3 | 4.8 | 1.1 (2.2) |
| Rest of the World | 3.4 | 0.1 | 3.3 | 1.5 (1.5) |
| **High-income countries** | **201.6** | **30.3** | **171.3** | **0.6 (0.5)** |
| **Developing countries** | **85.7** | **-29.7** | **115.4** | **0.8 (1.1)** |
| Middle-income countries | 69.5 | -16.7 | 86.2 | 0.8 (1.0) |
| Low-income countries | 16.2 | -12.9 | 29.1 | 0.8 (1.4) |
| East Asia and Pacific | 23.5 | -8.5 | 32.0 | 0.7 (1.0) |
| South Asia | 4.5 | -11.2 | 15.7 | 0.4 (1.4) |
| Europe and Central Asia | 7.0 | -4.0 | 11.0 | 0.7 (1.1) |
| Sub-Saharan Africa | 4.8 | -1.8 | 6.6 | 1.1 (1.5) |
| Latin America and the Carib | 28.7 | 2.2 | 26.5 | 1.0 (0.9) |
| **World total** | **287.3** | **0.6** | **286.7** | **0.7 (0.7)** |

[a] Numbers in parentheses refer to that due to efficiency gains net of terms of trade effects.

[b] Selected Sub-Saharan African countries include Botswana, Madagascar, Malawi, Mozambique, Tanzania, Uganda, Zambia, Zimbabwe.

*Source*: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.4).

Table 4: Regional and sectoral source of gains from full liberalization of global merchandise trade, developing and high-income countries, 2015

(relative to the baseline scenario)

| | Gains by region in $billion | | | Percent of regional gain | | |
|---|---|---|---|---|---|---|
| | *Devel-oping* | *High-income* | *World* | *Devel-oping* | *High-income* | *World* |
| **Developing countries liberalize:** | | | | | | |
| *Agriculture and food* | 28 | 19 | 47 | 33 | 9 | 17 |
| *Textiles and clothing* | 9 | 14 | 23 | 10 | 7 | 8 |
| *Other merchandise* | 6 | 52 | 58 | 7 | 26 | 20 |
| *All sectors* | 43 | 85 | 128 | 50 | 42 | 45 |
| **High-income countries liberalize:** | | | | | | |
| *Agriculture and food* | 26 | 109 | 135 | 30 | 54 | 47 |
| *Textiles and clothing* | 13 | 2 | 15 | 15 | 1 | 5 |
| *Other merchandise* | 4 | 5 | 9 | 5 | 3 | 3 |
| *All sectors* | 43 | 116 | 159 | 50 | 58 | 55 |
| **All countries liberalize:** | | | | | | |
| *Agriculture and food* | 54 | 128 | 182 | 63 | 63 | 63 |
| *Textiles and clothing* | 22 | 16 | 38 | 25 | 8 | 14 |
| *Other merchandise* | 10 | 57 | 67 | 12 | 29 | 23 |
| *All sectors* | 86 | 201 | 287 | 100 | 100 | 100 |

[a] Small interaction effects are distributed proportionately and numbers are rounded to sum to 100 percent.

*Source*: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.6).

Table 5: Impact of full liberalization of high-income countries' food and agric import barriers and subsidies on indexes of real[a] export and import prices, Sub-Saharan Africa, 2015

(percent)

| | Export prices | | Import prices | |
|---|---|---|---|---|
| | Agric & food | Other products | Agric & food | Other products |
| **Sub-Saharan Africa** | **2.5** | **1.2** | **4.3** | **0.4** |
| South Africa | 1.0 | 0.7 | 3.5 | 0.4 |
| Other Southern Africa | 4.1 | 3.2 | 2.8 | 0.5 |
| Rest of Sub-Saharan Africa | 2.2 | 1.1 | 4.8 | 0.3 |

[a] Relative to the numeraire which in this version of the LINKAGE model is the price of high-income countries' exports of manufactures.

*Source*: Anderson, Martin and van der Mensbrugghe (2006c).

Table 6: Terms of trade's contribution to real income changes from full liberalization of high-income countries' food and agric import barriers and subsidies, Sub-Saharan Africa, 2015

(in 2001 billion US dollars)

| | Change in regional welfare due to: | | |
|---|---|---|---|
| | Change in export prices | Change in import prices[a] | Sum of export and import price effects |
| Agric and food products **– all SSA** | **0.94** | **-0.38** | **0.56** |
| South Africa | 0.05 | -0.09 | -0.04 |
| Other Southern Africa | 0.36 | -0.03 | 0.33 |
| Rest of Sub-Saharan Africa | 0.53 | -0.25 | 0.28 |
| Non-agricultural products **– all SSA** | **1.45** | **-0.53** | **0.92** |
| South Africa | 0.35 | -0.15 | 0.20 |
| Other Southern Africa | 0.37 | -0.10 | 0.27 |
| Rest of Sub-Saharan Africa | 0.72 | -0.29 | 0.43 |

[a] The numbers in this column have the opposite sign to the import price indexes in Table 5 because an import price rise reduces real income (whereas numbers in the export columns have the same sign).

*Source*: Anderson, Martin and van der Mensbrugghe (2006c).

Table 7: Comparative static estimates of economic welfare gains from partial trade and subsidy reform under the Doha Development Agenda, 2015[a]

(in 2001 US billion dollars)

| | *Scenarios:* | | |
|---|---|---|---|
| | '***Pessimistic***': Agric-only reform, with sensitive products exceptions and with SDT | '***Central***': Agric and non-agric reforms, without sensitive products but with SDT | '***Optimistic***': Agric and non-agric reforms, without sensitive products and no SDT |
| Low-income countries | 0.1 | 12.5 | 17.1 |
| Middle-income countries | -0.5 | 16.1 | 22.7 |
| High-income countries | 18.1 | 79.2 | 96.4 |
| **TOTAL, World** | **17.7** | **96.1** (=0.2% of GDP) | **119.3** |

[a] For specifics of scenarios, see text (SDT = Special and Differential Treatment: two-thirds cuts by developing countries and none by Least Developed Countries).

*Source*: Anderson, Martin and van der Mensbrugghe (2006a, Table 12.14).

Table 8: Comparative static estimates of economic welfare gains from an FTAA compared with global liberalization of goods and services trade

(in 2001 US billion dollars)

(a) BKS study (goods and services reform)[a]

| | FTAA | Unilateral free trade by the Americas | Global full trade liberalization (by 100%) |
|---|---|---|---|
| United States and Canada | 79 | 403 | 641 |
| Latin America and Caribbean | 49 | 113 | 172 |
| **Total, Americas** | **128** | **516** | **813** |
| Rest of world | -10 | 364 | 1803 |
| **TOTAL, WORLD** | **118** | **880** | **2616** |

(b) HRTG study (goods reform only)[b]

| | FTAA | FTAA plus EU-Mercosur FTA | Global trade liberalization by 50% | *Doha scenario, lower-bound partial reform*[c] |
|---|---|---|---|---|
| United States and Canada | 3 | 2 | 4 | *6* |
| Latin America and Caribbean | 11 | 31 | 15 | *8* |
| **Total, Americas** | **14** | **33** | **19** | ***14*** |
| European Union | -3 | 23 | 43 | *31* |
| Japan | -1 | -1 | 50 | *24* |
| Other countries | -5 | -5 | 93 | *27* |
| **TOTAL, WORLD** | **5** | **50** | **205** | ***96*** |

[a] Values shown have been inflated from their reported 1995 values to 2001 values assuming 2 percent inflation per year (the change in the United States' GDP Deflator).

[b] Values shown have been inflated from their reported 1996 values to 2001 values assuming 2 percent inflation per year (the change in the United States' GDP Deflator).

[c] Taken from Scenario 7 in Anderson, Martin and van der Mensbrugghe (2006a, Table 12.14), as discussed in the text.

Sources: Brown, Kiyota and Stern (2005, Table 4) and Harrison, Rutherford, Tarr and Gurgel (2004, Table 6).

Table 9: Global labor force structure, 2001 and projected to 2025 without and with assumed extra migration

(millions)

| | Base 2001 | Base 2025 | 2025 with extra migrants | Number of extra migrants, 2001-25 | Difference in 2025 labor force (%) |
|---|---|---|---|---|---|
| ***Developing countries (DCs):*** | | | | | |
| Unskilled labor | 2396 | 3294 | 3284 | -9.8 | -0.3 |
| Skilled labor | 200 | 267 | 263 | -4.5 | -1.7 |
| **TOTAL, DC LABOR** | **2596** | **3561** | **3547** | **-14.2** | **-0.4** |
| | | | | | |
| ***High-income countries (HICs):*** | | | | | |
| DC migrant workers: | | | | | |
| Unskilled labor | 24.7 | 25.3 | 35.1 | 9.8 | 39 |
| Skilled labor | 3.1 | 3.2 | 7.7 | 4.5 | 138 |
| **Total DC migrant workers** | **27.8** | **28.5** | **14.3** | **14.2** | **50** |
| **TOTAL, HIC LABOR** | **480.8** | **474.0** | **488.2** | **14.2** | **3** |

Source: World Bank (2006, Table 2.2).

Table 10: Comparative static estimates of economic welfare effects of a boost to international worker migration, 2025

(in 2001 US billion dollars)

| | $ billion | *Share (percent)* |
|---|---|---|
| New migrants | 481 | *71* |
| Natives (non-migrants) in developing countries | 143 | *21* |
| **TOTAL, current DC citizens** | **624** | ***92*** |
| | | |
| Natives in high-income countries | 138 | *21* |
| Recent migrants in high-income countries | -88 | *-13* |
| **TOTAL, current HIC citizens** | **50** | ***8*** |
| | | |
| **WORLD TOTAL** | **674** | ***100*** |

Source: World Bank (2006, Table 2.3).

Table 11: Net present value of benefits and costs to 2100, and benefit/cost ratios, from liberalizing subsidies and trade barriers globally under the WTO's Doha Development Agenda, and liberalizing migration

(in 2001 US billion dollars)

**Trade reform benefit/cost ratio including dynamic gains**

| | 3% discount rate | | 6% discount rate | |
|---|---|---|---|---|
| | Low | High | Low | High |
| Global | 1121 | 932 | 363 | 269 |
| Developing | 3147 | 2724 | 895 | 692 |

**Trade reform costs and benefits including dynamic gains (NPV 2008)**

| | 3% discount rate | | | | | | 6% discount rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | | | High | | | Low | | | High | | |
| | GB | C | NB | GB | C | NB | GB | C | NB | GB | C | NB |
| Global | 172666 | 154 | 172512 | 424495 | 456 | 424039 | 51485 | 142 | 51343 | 113028 | 420 | 112607 |
| Developing | 161583 | 51 | 161532 | 419477 | 154 | 419323 | 42355 | 47 | 42308 | 98215 | 142 | 98073 |

**Migration reform benefit/cost ratio without dynamic gains**

| | 3% discount rate | | 6% discount rate | |
|---|---|---|---|---|
| | Low | High | Low | High |
| Global | 336 | 112 | 137 | 45 |
| Developing | 838 | 279 | 299 | 100 |

**Migration reform costs and benefits without dynamic gains (NPV 2008)**

| | 3% discount rate | | | | | | 6% discount rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | | | High | | | Low | | | High | | |
| | GB | C | NB | GB | C | NB | GB | C | NB | GB | C | NB |
| Global | 37852 | 113 | 37739 | 37852 | 338 | 37514 | 12456 | 91 | 12365 | 12456 | 274 | 12182 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developing | 47197 | 56 | 47141 | 47197 | 169 | 47028 | 13628 | 46 | 13582 | 13628 | 137 | 13491 |

**Trade reform benefit/cost ratio without dynamic gains**

| | 3% discount rate | | 6% discount rate | |
|---|---|---|---|---|
| | Low | High | Low | High |
| Global | 47 | 80 | 17 | 28 |
| Developing | 68 | 113 | 21 | 35 |

**Trade reform costs and benefits without dynamic gains (NPV 2008)**

| | 3% discount rate | | | | | | 6% discount rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | | | High | | | Low | | | High | | |
| | GB | C | NB | GB | C | NB | GB | C | NB | GB | C | NB |
| Global | 7260 | 154 | 7106 | 36298 | 456 | 35842 | 2371 | 142 | 2229 | 11856 | 420 | 11436 |
| Developing | 3473 | 51 | 3422 | 17367 | 154 | 17212 | 981 | 47 | 933 | 4903 | 142 | 4761 |

**Trade and migration reform benefit/cost ratio without dynamic gains**

| | 3% discount rate | | 6% discount rate | |
|---|---|---|---|---|
| | Low | High | Low | High |
| Global | 169 | 93 | 64 | 35 |
| Developing | 471 | 200 | 157 | 66 |

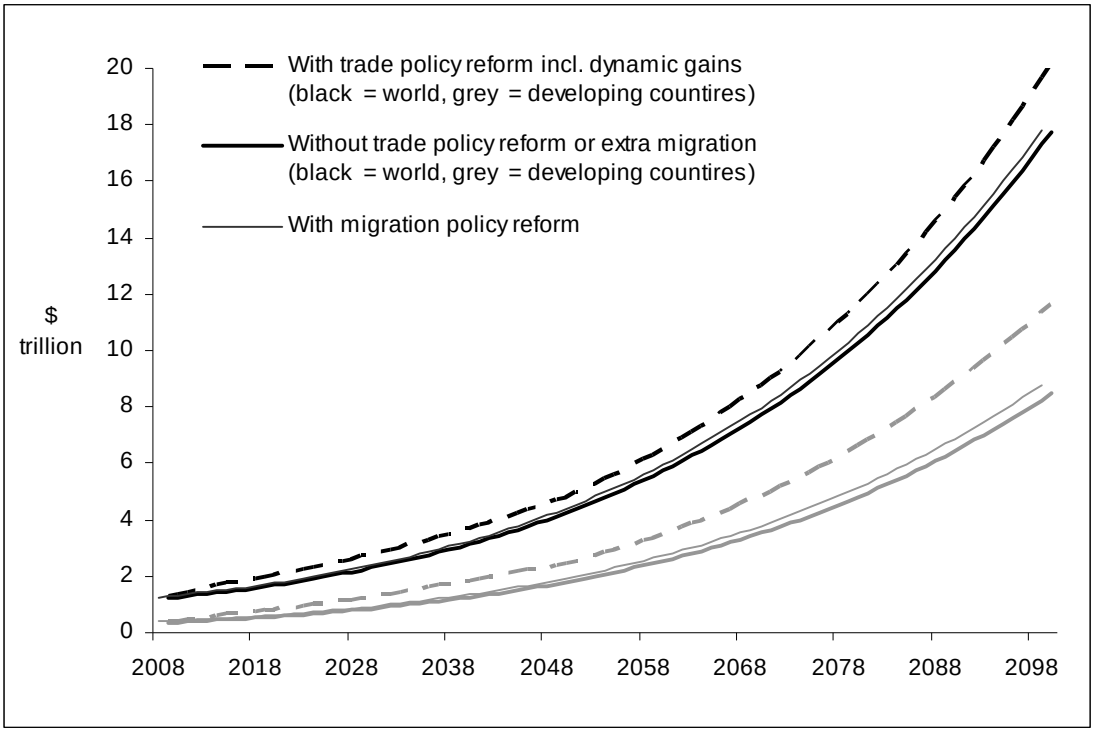
**Trade and migration reform costs and benefits without dynamic gains (NPV 2008)**

| | 3% discount rate | | | | | | 6% discount rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | | | High | | | Low | | | High | | |
| | GB | C | NB | GB | C | NB | GB | C | NB | GB | C | NB |
| Global | 45112 | 267 | 44845 | 74150 | 794 | 73356 | 14827 | 233 | 14594 | 24312 | 694 | 23618 |
| Developing | 50670 | 108 | 50562 | 64563 | 323 | 64240 | 14609 | 93 | 14516 | 18531 | 279 | 18252 |

Source: Authors' calculations based on assumptions in text

Figure 1: Undiscounted increments through to 2100 of world and developing country incomes without reform and with a Doha trade policy reform (without extra migration)

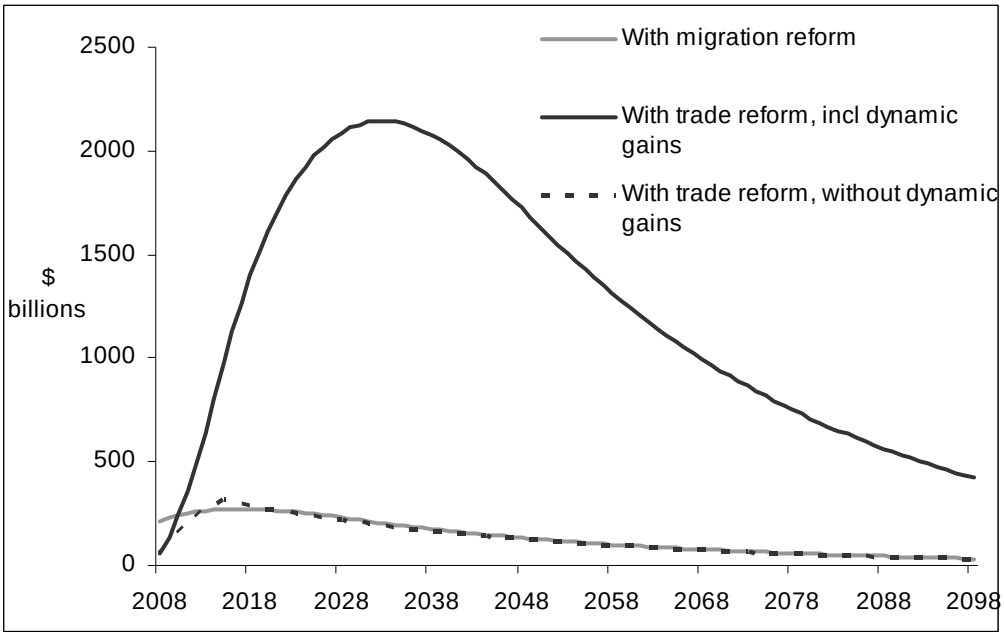
(high net gains cases, in current US 2001 trillion dollars per year)



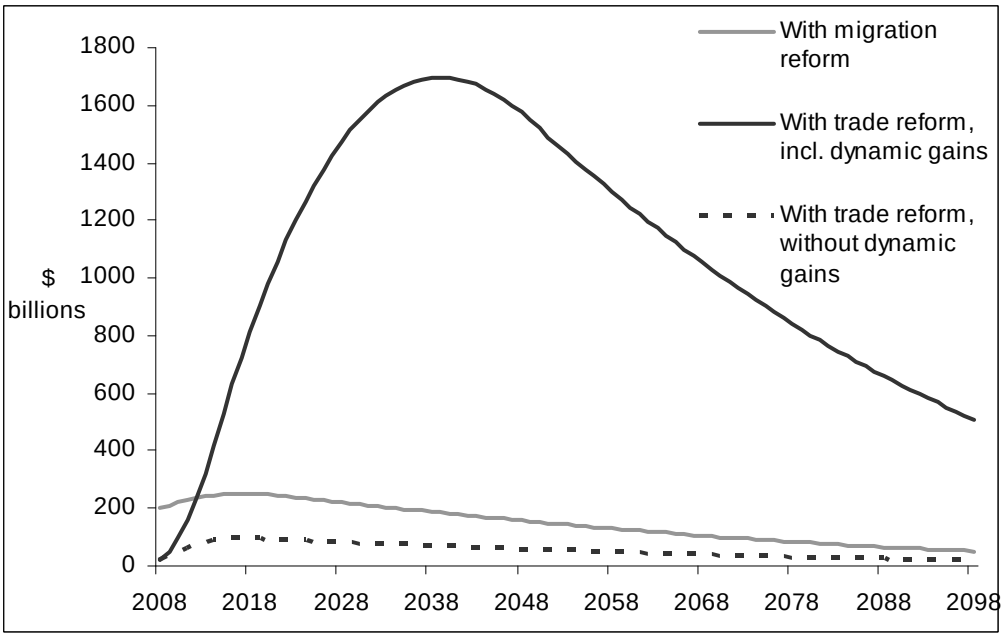

Source: Authors' estimates underlying Table 11's High Net Gains cases

Figure 2: Net present value of discounted annual increments to 2100 of world and developing country incomes without reform, with trade policy reform, and with extra migration
(high net gains cases, in US billion dollars per year, using a discount rate of 6 percent p.a. to express it in 2008 present value terms)

(a) NPV of world GDP increments




(b) NPV of increments to incomes of developing country citizens (including emigrants)




Source: Authors' estimates underlying Table 11's High Net Gains cases